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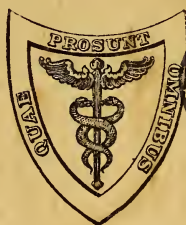
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THE
AMERICAN JOURNAL
OF THE MEDICAL SCIENCES.

AUGUST, 1896.

CASES ILLUSTRATIVE OF THE PRACTICAL APPLICATION OF
THE RÖNTGEN RAYS IN SURGERY.

BY J. WILLIAM WHITE, M.D.,
PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA;

ARTHUR W. GOODSPEED, PH.D.,
ASSISTANT PROFESSOR OF PHYSICS, UNIVERSITY OF PENNSYLVANIA;

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CHARLES L. LEONARD, M.D.,
ASSISTANT INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA.

THE Röntgen method is, of course, in its infancy. It has, however, already reached a degree of usefulness that makes it obvious that the necessary apparatus will be an essential part of the surgical outfit of all hospitals and will be employed constantly in a variety of cases. Those to which the method can now be applied with advantage may be summarized as follows, emphasis being placed on the fact that what is written to-day may require revision or reversal to-morrow, so rapidly are improvements and discoveries taking place:

1. *Foreign bodies imbedded in any of the tissues of the body.* This is at once the most obvious and the simplest application of the skiagraph to surgery. Hundreds of cases have already been reported. Bullets, fragments of metal or of glass, needles, etc., are easily found, and, even if they are lodged in bone, the varying density of the shadows cast by substances of different permeability or of different chemical constitution will serve to define and locate them. It is desirable, if the foreign body be in a locality containing important surgical structures, that skiagraphs be made from at least two points of view, so that the depth from the surface and the exact relations of such body can be determined by measurement. A single skiagraph of a piece of steel in the arm, for example (Case X., Plate VIII.), taken from the front shows merely

its relation to the inner or outer edge of the arm, not at all its depth. A second view taken laterally would make the precise situation evident.

2. *Foreign bodies in certain of the organs and viscera* are likely to be discovered and located with a degree of accuracy that will vary with the region or structure involved and with the thickness of the enclosing tissue. Waggett and Rowland have shown (*British Medical Journal*, March 19, 1896) that a fish-bone and a small nail attached by plaster to the side of the neck in the position of the ventricle can be skiagraphed with ease. The larynx itself did not show at all, but by the aid of a chart of the region the exact position of a foreign body in the larynx ought to be easily determinable. It is obvious that extension of the method to the location of such bodies in the trachea, bronchi, and other portions of the air-passages is sure to come with further improvements in technique. In the digestive tract, except, perhaps, the first third of the œsophagus, the difficulties are greater; but the presence or absence of foreign bodies can doubtless be determined, although below the stomach it is questionable whether any definite information as to the exact situation can be obtained. In many cases, however, especially in children, it is a matter of grave doubt as to whether or not some foreign body has been swallowed. As the most uncertain cases occur in the youngest children, and as the ease of skiagraphy of the whole body is in direct proportion to the thinness and softness of the tissues, we may expect in just these cases to get the exact information which is so often lacking in the history given by anxious parents or nurses. Within the cranium neither experimental tests nor trials in actual cases have yet given any practical results in the discovery or location of foreign bodies, but there is every reason to believe that this will become possible in the near future.

3. *Foreign bodies formed within the organism itself* include chiefly gallstones and renal, vesical, and prostatic calculi.

Gallstones skiagraphed without the body cast very faint shadows; calculi of oxalate of lime, of phosphate of lime, and of triple phosphate cast shadows as dense as those of bone or metal; uric-acid calculi cast easily recognizable but somewhat fainter shadows (*British Medical Journal*, London, April 4, 1896).

No practical results have yet been obtained in the discovery of these forms of calculi, but it seems within bounds to expect that after we become more familiar with the shadows cast by the normal viscera and the normal skeleton, we may be able to distinguish gallstones from malignant disease involving the ducts; may locate or exclude renal calculi in doubtful cases; and may see encysted vesical or prostatic calculi even through the shadows cast by the pelvic bones themselves. Many skiagraphs show in outline the shadow of one bone through the shadow of another (Case VI., Plate V.), and it is not improbable that after a time accurate diagnoses can be made in this manner. At present it is not possible.

PLATE I.



Case II. Ununited Fracture of Both Bones of the Forearm.

PLATE II.



Case III. Dislocation of Both Bones of the Forearm Backward, with Ankylosis.

PLATE III.



Case IV. Obscure Fracture Involving the Ulna and Humerus.

PLATE IV.

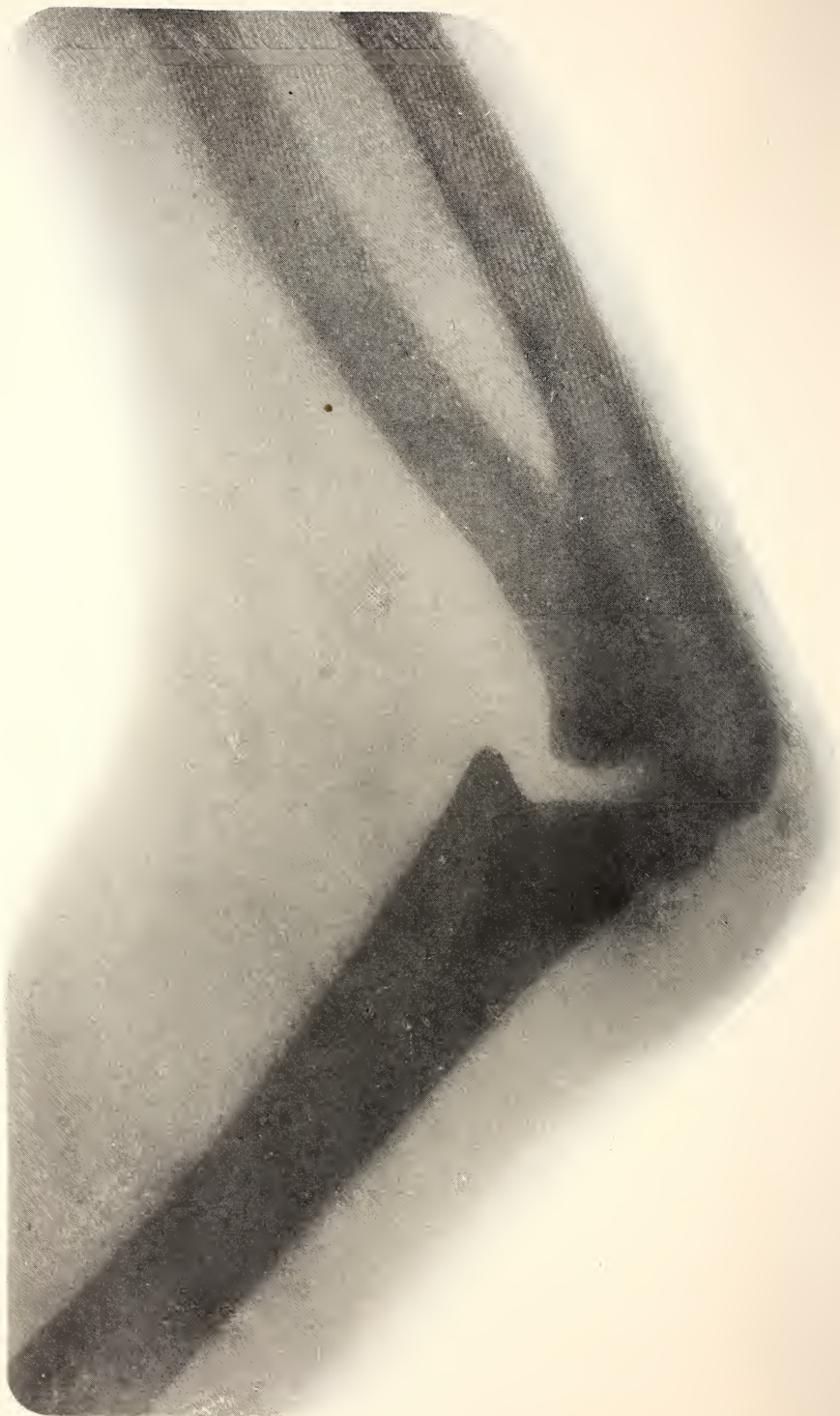


Case V. Excision of the Head of the Radius.



Case VI. Curvature of the Radius, due to Arrested Development of the Ulna at its Distal Epiphysis.

PLATE VI.



Case VII. Diastasis of the Distal Epiphysis of the Humerus.

PLATE VII.



Case IX. The Results Obtained in Excision of the Knee.

PLATE VIII.



Case X. Foreign Body in the Arm.

PLATE IX.



Case XI. Bullet in Forearm.

PLATE X.



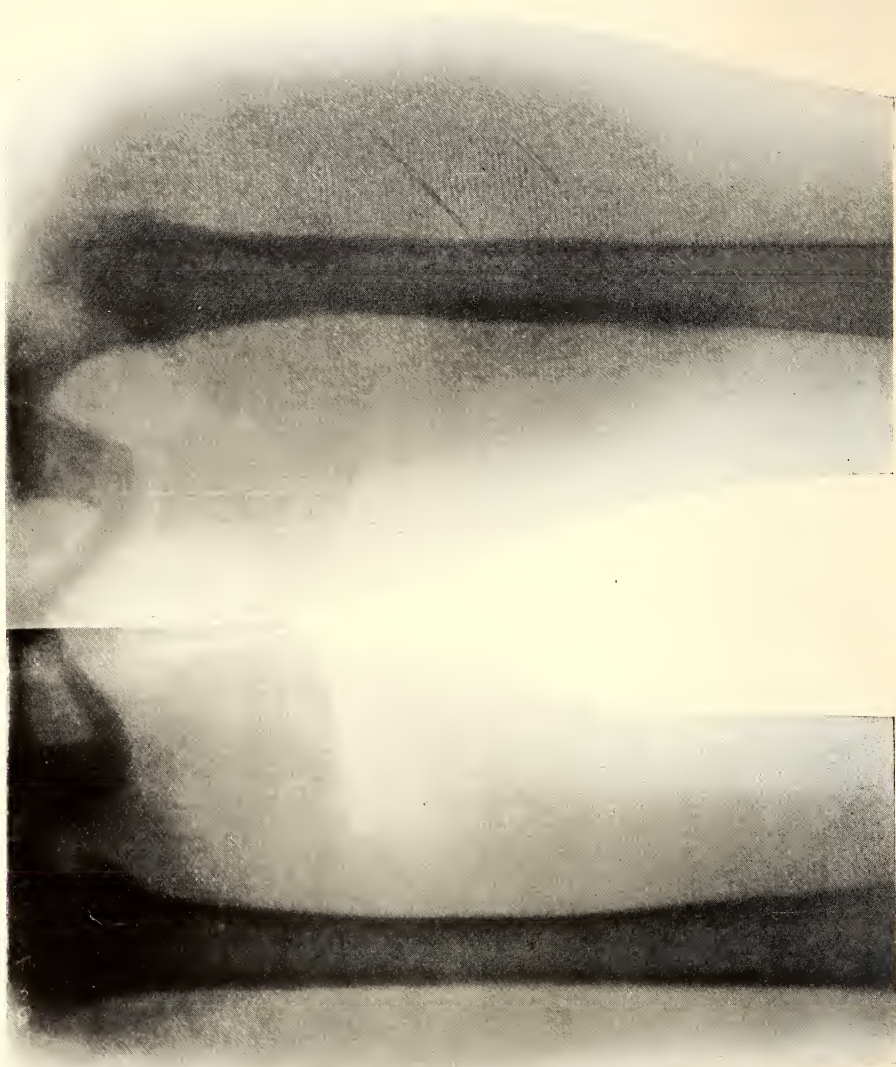
Case XII. Metatarsalgia.

PLATE XI.



Case XIII. Condensing Osteitis in Femur. ..

PLATE XII.



Case XIV. Subperiosteal Abscess of the Right Femur and Normal Left Femur.

4. *Inflammatory swellings and new growths* (except when bony) have not yet been shown to offer any special features diagnosticating them from normal structures. Bony tumors can plainly be seen, and as the method improves it is to be expected that intracranial and intraspinal osteomata may be discovered and located and possibly even periosteal thickenings due to tubercular, syphilitic, or pyogenic infection. Dead bone cannot as yet be distinguished from living bone, but it is reasonably certain that by greater perfection in detail we shall soon be able to outline the exact position and extent of a sequestrum, this again being made possible by the transparency of the bone-shadow itself; so that, for example, in a case of necrosis of the femur the shadow of that bone and the shadow of a sequestrum contained within it may be superimposed and plainly separable on the skiagraph. Abscess in bone can be made out perfectly.

Comparison of the normal limb with that which is the subject of tubercular or other chronic bone-disease will often reveal the full extent of the latter better than any method of exploration, and in a recent case led me to perform amputation through the hip-joint instead of through the upper third of the femur, the condition found abundantly justifying the procedure.

5. *Fractures and dislocations* at present offer the greatest field for the every-day use of the Röntgen method. It is impossible at this time to present exhaustively the conditions under which it should invariably be used, or to separate them from those in which it is a matter of interest rather than of necessity; but it is safe to say that it will be wise to employ it when possible.

a. In all fractures in or about joints either as a preliminary to the reduction of the deformity, or as evidence that such reduction has been accomplished. These fractures are, for unavoidable reasons, often followed by some limitation of motion and a more or less imperfect functional result. They have, therefore, on innumerable occasions been the basis for suits for malpractice. It will be both a satisfaction and a safeguard for the surgeon if he can see that his work has been accomplished properly and can retain definite evidence of that fact.

b. In doubtful cases or cases supposed to be of great rarity, it will be of inestimable value (Case VII., Plate VI.), both as aiding diagnosis and as demonstrating and recording the conditions present.

c. In cases of old injury in which, as so frequently happens, no reliable clinical history is obtainable and no accurate diagnosis can possibly be made by the ordinary methods. (Cases III., IV., and V., Plates II., III., and IV.)

d. In cases of ununited fracture, both to show the exact position and relation of the fragments prior to operation, the presence or absence of interposing structure, etc. (Case II., Plate I.), and also to show after

operation the degree of efficiency of the wire, or of the peg or screw, or of the splint, or other retaining-apparatus. We may frequently determine in such cases whether or not open operation is needed, union often being obtainable, where the fragments can be brought into good position and nothing is interposed, by mere friction and the reapplication of the splint or other dressing.

6. In cases of *excision of joints* at the time when, for example, in the knee it is desirable to demonstrate that bony union has been obtained and in the elbow that it has been avoided. (Case IX., Plate VIII.) (Case V.)

7. In cases of *deformity* of all sorts affecting the bones, their epiphyses, or diaphyses, and requiring careful investigation before surgical interference is declined or advised. (Case VI., Plate V.)

8. In many *obscure cases* of the type of metatarsalgia, in which the demonstration of the cause of the nerve-pain and the indication for surgical treatment are equally clear and convincing. (Case XII.)

ILLUSTRATIVE CASES.

I.—The patient, W. S., was admitted to the wards on January 23, 1896. Seventeen weeks previous to his admission he sustained a compound fracture of both bones of the right forearm. The flesh-wounds healed rapidly, but the bones remained ununited and at an angle, although they were treated by fixation in a plaster-dressing for some time.

The operation showed that the line of fracture was in the middle third of each bone. The extensor carpi radialis was found interposed between the fragments of the radius, where they overlapped one and one-half to two inches, effectually preventing any chance of union. The upper fragment was in extreme supination, while the lower was in extreme pronation.

The fragments of the ulna showed an attempt at the formation of a false joint, the proximal end of the lower fragment containing a cavity in which the distal end of the upper fragment was held. Great difficulty was experienced in getting anything like a proper approximation of the bones on account of the extreme rotation in opposite directions of the two fragments of the radius and because the interosseous space was more nearly obliterated between the lower fragments.

The resected ends of the bones were held in position by wire sutures and the flesh-wounds closed by interrupted sutures. The flesh-wounds healed rapidly, but bony union seems doubtful as yet. The skiagraph shows the position of the bones and the silver sutures in position, and illustrates the ability we now have, without disturbing the wound itself, or the limb, or even the dressings, to obtain accurate knowledge of the exact position of the bones after an operation of this character. Such information might be of the very highest practical importance. It might lead to a change of apparatus, to an alteration in the position of the limb, to a second operative attempt, etc., and it would almost certainly aid in giving definiteness to prognosis and in determining without undue motion of the part the final result as to the presence or absence of bony union.

II.—H. P., aged thirty-three years. On February 7, 1896, the patient was caught in the belt of a pulley and thrown down about six feet. He fell upon his left hand, bending it under him in extreme flexion. The patient was taken to a hospital, which he left seven weeks afterward without the consent of the attending surgeon. On admission to the University Hospital an ununited fracture was diagnosed, with the formation of callus and an attempt at union; preternatural mobility was, however, marked.

The operation showed the condition to be exactly that seen in the skiagraph, the lines of fracture were as they are there shown; a fibrous union existed between the distal end of the upper fragment of the ulna and the proximal end of the lower fragment of the radius. This attempt at union was broken up, and the ends of the fragments were freshened and united by drills, which were left *in situ*. The skiagraph was here of distinct assistance during the operation, enabling me to cut down upon and to remedy the deformity with the least possible disturbance of parts.

III.—C. R. L., aged thirty-six years, was admitted to the University Hospital March 31, 1896, with an ankylosis of the elbow. He gave the following history: In the latter part of January, 1895, he fell down stairs, striking on his elbow. The arm was dressed on a splint in full extension. This was continued for three weeks, when the arm was placed at an angle and dressed on a posterior moulded metal splint. After about four weeks passive motion was commenced, and a little later considerable force was used. The patient continued treatment for about three months longer and then stopped all treatment until he came to the hospital.

The diagnosis of dislocation of both bones of the elbow backward was easily made.

The skiagraph gave an apparently blurred and indefinite outline of the joint, which before operation seemed rather unsatisfactory. The operation, however, showed it to be exactly correct, the joint was dislocated, was ankylosed, and was surrounded by a large amount of dense callus, making excision of the joint with the arm in extension and fixed very difficult. The callus was exceedingly hard and united the olecranon process to the humerus. It was necessary to divide the olecranon and cut it free from the humerus with a chisel. The joint was cut part way through and then broken, thus permitting the completion of the excision.

There can be no doubt that as we acquire greater familiarity with this method we shall be able to recognize exact conditions as shown by different depths of shadow, etc., with much more accuracy. In this instance, for example, the facts were before me prior to the operation, but except that I saw that my diagnosis of backward luxation was confirmed, I got no help from the skiagraph. In future cases of the same sort I shall profit far more by the picture—at least to the extent of anticipating—and, when necessary, providing for the special difficulties of the case. This patient has recovered with a most useful and satisfactory arm.

IV.—F. McD., a carpenter, aged twenty-four years, fell from the roof of a house, a distance of forty-four feet, four years previous to his admission to the University Hospital.

There was a great amount of ecchymotic swelling; a fracture was diagnosed and the arm dressed in a posterior moulded felt splint. It was kept in this position for ten weeks; after this time the patient began by himself the use of passive motion, and succeeded in getting sufficient movement to enable him to pursue his occupation, although the arm was always tender, and cannot be flexed sufficiently for him to reach his mouth.

Two days before he presented himself at the hospital he heard, while at work, a loud snap which was followed by pain and increased disability. The skiagraph shows the normal outline of the bones, with in addition an amount of callus on the coronoid process of the ulna (?) and a free fragment of bone (?) above and external to the head of the radius. (See figure.)



CASE IV.—External view, showing displaced fragment of bone.

This case has not yet been operated upon. It illustrates better than any I have ever seen the uncertainty which still exists as to the interpretation of the skiagraphic picture, and it also shows the obscurity of many of these combined bone- and joint-lesions. I exhibited this patient, with the skiagraph, at a recent meeting of a surgical society. He was examined by several skilful and able surgeons, each of whom reached a different conclusion as to what he saw in the picture and felt in the arm. They all differed from my own view. The case will be reported in full after operation.

V. *Excision of the head of the radius.*—This case, of excision of the head of the radius for forward luxation with limitation of the power of flexion, was sent to the hospital by Dr. D. P. Miller, of Huntingdon; the history was obscure, as a previous injury had made a clear diagnosis impossible.

Excision of the head of the radius was decided upon and the operation was performed; the patient regained the power of flexion, with, however, only a very slightly increased amount of pronation and supination.

The skiagraph, taken after the recovery of the patient, shows the radius after the excision of the head and also an old fracture of the ulna with adhesions to the radius, accounting for the limitation still remaining

in the power of pronation and supination. It also illustrates in a most marked manner the great usefulness of the Röntgen photographs in cases of old injury that are sent to hospitals for treatment, without a true history or diagnosis of the condition of the parts at the time of the former accident. The failure to secure a greater amount of pronation and supination was a disappointment to me at the time, and seemed inexplicable. The discovery of the old fracture and its adhesions completely cleared up all doubt as to the cause of the continuing disability and at the same time enabled me to decide that further operative interference was not indicated.

VI. *Curvature of the radius due to arrested development of the ulna at its distal epiphysis.*—E. A., aged fifteen years, came to the hospital for advice in January, 1896. The family history showed one case of tuberculosis, a paternal aunt, but there were no other cases in any other generation. The paternal grandfather had an epithelioma of the lip, which was excised without recurrence.

The patient had had the diseases of childhood, but no severe or protracted illness. The present trouble began in the seventh or eighth year, when a little lump was noticed on the arm and the patient complained of pain located at that point. There was no sign of curvature at that time, it has come on gradually since, while the pain has been inconstant and rheumatic in character, seemingly following a slight cold at each attack.

The patient has fair use of the hand and can write with it and do almost everything needful, so no operation was advised.

The skiagraph and the photograph show very well the condition and appearance of this forearm, and, if functional disability were greater, would serve excellently in locating the proper seat for operation if, for example, excision of a portion of the radius were decided upon.

VII. *Diastasis of the distal epiphysis of the humerus, resulting from a fall on the hand.*—W. McL., aged eleven years, came to the hospital on March 31, 1896, with fracture of the humerus.

The history was of a fall from a wall five feet high to the pavement, striking on the left hand. The patient weighed about seventy-five pounds; he sustained no other injury.

The case was diagnosticated and dressed before the skiagraph was developed, the latter demonstrating the correctness of the diagnosis and showing the position of the fragments resulting from this rare form of epiphyseal separation.

The new record that will now be made and kept of such cases as this will in time alter our statistics entirely as to the frequency of various forms of fracture or of epiphyseal injury. It will no longer depend on the skill and experience of the particular surgeon (though they will be of no less value to the patient than before), but will doubtless soon be made up of irrefutable testimony as to the exact conditions present.

VIII. *Diastasis of the proximal epiphysis of the humerus, with overlapping of the fragments and union in a faulty position.*—S. B., aged sixteen years, fell heavily on the left shoulder, while playing football, in December, 1895. He passed through the hands of two doctors; the condition was then recognized by Dr. E. M. Corson, of Norristown, who sent him to the hospital for operation.

At the operation a longitudinal incision through the deltoid toward the anterior border showed the proximal end of the lower fragment overlapping the upper fragment by about two inches, with firm bony union between the two fragments. The upper end of the lower fragment lay beneath the coracoid process and interfered materially with the function of the joint. The upper portion of the lower fragment was resected, giving the joint free motion. The patient made a good recovery. The skiagraph showed the position of the fragments after the operation and their lateral union in a faulty position.

IX. *The results obtained in excision of the knee.*—This skiagraph shows the union between the femur and tibia resulting after an excision for marked tubercular disease. As in the cases of ununited fracture, it illustrates the advantage which may accrue from escaping the necessity of determining by an attempt to elicit motion whether or not bony union between apposed bones has been obtained. Very often while both patient and surgeon are anxious as to the result of operation it can only be determined positively by the application of a degree of force which is in itself harmful. The progress of the case can be watched if necessary by the use of this method, any displacement of bones immediately remedied, and the final outcome seen without the very least disturbance of the parts.

X. *Foreign bodies in the arm.*—This skiagraph shows a piece of steel in the lower portion of the upper arm, which was easily located by the aid of the skiagraph. It shows, however, as has already been said, merely the relation of the steel to the inner border of the arm, leaving in doubt its relation to the anterior or posterior surface. The former point was easily made out by exact measurement, and, of course, in this case and in this locality, removal was easy. But it might be of vital importance to know the depth of the layer of tissue occupied by such a body. A second radiograph taken laterally would supply this information.

XI. *Bullet in the forearm.*—This was an interesting illustration of the difference in accuracy between the old methods and the present ones in the search for foreign bodies. The bullet (32-calibre, rifle) had entered the upper arm on the outer side, years before. An elaborate dissection had been made some time afterward in the attempt to find it. The patient was annoyed by the knowledge of its presence and complained of more or less vague nerve-pain affecting the whole extremity, no localizing symptoms being present. The arm was large and muscular. The skiagraph happened to include the forearm and by accident the bullet showed on the extreme edge of the plate. It lay on the inner edge of the ulna, partly overlapping the interosseous membrane. While Von Bergmann's warning against meddlesome surgery in these cases is timely and well-founded, it is certain that in this situation there were possibilities of later troubles if by a second traumatism the sharp edge of the missile had been driven against either the nerves or vessels of the part.

XII. *Metatarsalgia.*—Mrs. —, a patient of Dr. S. Weir Mitchell, had suffered for years from pain about the metatarso-phalangeal junction of the right foot.

The skiagraph shows that as a result of wearing pointed shoes there is a deformity consisting in part of the obliteration of the normal metatarsal spaces, with consequent pressure upon digital nerves and pain, sometimes intolerable. Walking in the bare feet or in stocking-feet as

a systematic exercise is, in mild cases, sometimes curative. Resection of portions of the metatarsal bones is indicated in others. In either case the skiagraph is of great advantage as a guide to the surgeon.

XIII. *Condensing osteitis*.—This skiagraph shows the femur of a young adult, a patient of Dr. Pyle, of Wilmington, who has had a tubercular osteitis of the lower end of the femur with necrosis. Following operation the wound healed entirely. The picture was taken some months later. It appears to show distinctly the area of condensing and formative osteitis which followed the operation, and also seems to show that no cavity and no sequestrum remain. Such deductions will, however, become more and more positive as we obtain larger numbers of skiagraphs, both of diseased conditions and of normal ones with which to compare them.

XIV. *Subperiosteal abscess*.—This skiagraph, taken from the diseased right and normal left thighs of a child, shows indistinctly on the right the outline of a very large swelling having every clinical characteristic of sarcoma, occupying its upper two-thirds. Months previously I had made a diagnosis of periostitis in this case. This fact led me to consider the possibility of abscess, although the physical conditions of the swelling seemed most unlike it. The skiagraph also seemed too indistinct in outline to represent a true bony growth, though as yet all this was problematical. At any rate the case proved to be an enormous abscess, stripping the periosteum from the femur throughout its entire length. At the time of operation the child had a temperature of 100° to 101°. It is apparent that even such swellings, while far more indistinct in the skiagraphs than normal bone, and probably not so definite as growths originating in bone, may yet easily be differentiated from the surrounding structures.

I confidently anticipate great improvement in this direction and the extension of the method to the differential diagnosis between abscess and new growths involving deeper portions of the body.

XV. *Foreign body in the œsophagus*.—This case was the first, so far as I know, either in this country or abroad, in which the presence of a foreign body in the œsophagus was revealed by the Röntgen rays. A child, aged two years and five months, a patient of Dr. Taubel, of Philadelphia, had been complaining for ten days of some difficulty in swallowing and had begun to reject all solid food, although it would still take small quantities of milk. Attempts at feeding it with even semi-solids invariably resulted in vomiting. There was no clear history of any foreign body having gained access to its digestive tract, but it was known that a plaything known as a jack-stone was missing from a set which the child had been using. When she was brought to me I sent her at once to Professor Goodspeed to have a skiagraph made, with the result of immediately obtaining the most accurate and definite information. The plate obtained after a three minutes' exposure revealed not only the presence, but the precise location of the body. The following morning, after carefully weighing the chances of the case after œsophagotomy or gastrotomy, I decided in favor of the latter, as the length of time which had elapsed made it probable that the jack-stone had become very firmly lodged and would be difficult to withdraw by the forceps even through an œsophageal wound. The result showed

the correctness of this belief. After the stomach was opened a fine rubber explorer was passed through the pharynx and out of the stomach-wound carrying a long piece of stout silk attached to it. The explorer was withdrawn and wads of gauze of various size were tied to the silk; some of these could not be carried either way beyond the jack-stone, but, whether pulled downward through the mouth and pharynx or upward through the stomach, were arrested when they reached it, even although very considerable force was used. Finally, however, the proper size was found and the jack-stone was pulled downward into the stomach, from which it was easily extracted. The mucous membrane was then at once stitched together with a continuous catgut suture and the whole wound was inverted by a continuous Lembert suture. The operation, including preliminary attempts at removal by forceps, took something less than a half hour. The child reacted well, and has entirely recovered.¹

The propriety of attempting extraction by forceps, guided by direct inspection at the time with the aid of the fluoroscope, was considered by me; but the attempt was not made on account of the presumably ulcerated and inflamed condition of the œsophagus, contraindicating instrumentation in that canal. The method will doubtless prove applicable in the future to many cases seen earlier.

A large number of other cases have occurred in my service, but these are sufficiently illustrative of the extent and variety of the application of this method of surgery.

Professor Goodspeed has kindly prepared the following account of the method by which he secured the excellent and helpful pictures of the foregoing cases:

The apparatus which has been used in the work illustrating this article consists essentially of four parts. The first is a storage-battery of twelve cells, arranged six in series and two in multiple arc, giving an electromotive force of about twelve volts. The second part of the apparatus is a current-interrupter of special construction run by a motor and arranged to give from one to three thousand breaks per second. The contact-points of the interrupter are made of thick pieces of platinum, and on either side are attached the terminals of a variable condenser in three parts to take up the extra current due to self-induction in the coil and thus to make the break more sudden. The third part consists of an inductorium of the Ruhmkorff type, the primary coil of which is attached to the interrupted battery circuit. The secondary circuit is attached to the terminals of the fourth element of our set of apparatus, viz., the Crookes's tube. The tube which has been used in much of the work and found very efficient was made by the Knott Company, of Boston, from a plan made by the writer. It is a glass bulb about four inches in diameter, exhausted to such an extent that under the electric discharge no blue halo appears at either terminal. The glass fluoresces a brilliant green. The cathode or the terminal attached to the negative pole of the

¹ This case was published in full in the University Medical Magazine for June.

secondary coil is a concave aluminum disk about one and a quarter inches in diameter. In the centre of the curvature of this, viz., about three inches from it, is placed the anode, consisting of a flat platinum disk. The wires to which these disks are fastened are sealed into the glass by German enamel and covered nearly their whole length within the tube by this material.

By this means internal sparking is almost entirely avoided. We have several coils capable of giving different intensity-effects. The one which seems best adapted to all grades of work gives a ten-inch spark in air. The exposures required depend, of course, upon various conditions, and were from a few seconds to three or four minutes. This leads us to an important detail in connection with this work, viz., the sensitive plate upon which the negatives are made. We have made many experiments upon various plates on the market and have been associated with Mr. John Carbutt in the development of a plate especially adapted to this purpose. Upon the efficiency of the plate that Mr. Carbutt now makes depends, I feel sure, much of the excellence of the work that we have lately done.

For sharpness of detail it is necessary, of course, to have the part to be skiagraphed as near the film as possible. It is found convenient, therefore, to wrap the plate in two or three thicknesses of thin black rubber-covered cloth, which is quite effectual in excluding all light during the exposure. This plate is then bound tightly to the part with long gauze bandages, film-side to the skin. The Crookes's tube is placed on the other side of the part from one to two feet away, according to circumstances. It is probable that the resultant effect obeys the law of "inverse squares;" so that to produce the same density in the negative in two experiments the times of exposure should be proportioned to the square of the distance of the tube from the plate.

Many details in the manipulation of the various parts of the apparatus have to be attended to continually, and the best results are obtained only when all the various parts are carefully and properly balanced. When the cathode is large the tube seems to be more powerful for the time, but it wears out soon—*i. e.*, its exhaustion gets so high that the largest coil will produce no discharge through it. Under these circumstances it has to be opened and re-exhausted to the proper degree. It is clear, then, that the conditions necessary for the very best results cannot be realized very long at a time.

The fluoroscope, consisting of a screen of cardboard covered with calcium tungstate, is a very useful and almost necessary addition to the equipment. If such a screen takes the place of the photographic plate, and the eye, shielded from external light, be placed behind it, shadows of the bones or foreign bodies can be plainly seen on the screen.

In many simple operations the use of the fluoroscope would be quite sufficient to gain all needed information.

PAINFUL POINTS IN GOUTY COMPARED WITH RHEUMATIC ARTHRITIS.¹

By W. H. THOMSON, M.D., LL.D.,

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THE differential diagnosis between acute gout and acute rheumatism is usually simple enough in typical cases, especially when of recent origin. In many chronic cases, however, particularly when gouty arthritis has become general, the differentiation may not be so easy, and in practice we frequently find gouty cases treated for rheumatism or rheumatic patients dosed with colchicum.

For a number of years I have been accustomed to point out that a careful manipulation, of the inflamed joints in these affections will show specific contrasts between them in the localization of the greatest tenderness on pressure. I supposed that this clinical fact had been noted before, but, not finding any reference to it in the works which I have been able to consult, I take this occasion to present the following observations on cases of gout and of rheumatism occurring in my service at the Roosevelt and the Bellevue Hospitals, of New York, during the past few months, with some cases of gout in private practice.

GOUT. Whole number of cases of gout, 34: males, 27; females, 7. The first attack in the history of the patients began in the lower extremities in 31, or 98.9 per cent. In two chronic cases the patients were uncertain where it first began. In one, a painter by trade, and affected with chronic plumbism, the first attack involved the left shoulder as well as his feet.

The first attack was monoarticular in 73 per cent., and polyarticular in 27 per cent. I am inclined to think, however, that the percentage of monoarticular first attacks was higher, particularly in the hospital patients, for the memory of some of the more chronic cases on this point was rather indefinite.

The pulse was noted as of high tension in 98 per cent., and not of high tension in 2 per cent. The arteries were found thickened in 44 per cent., and not thickened in 56 per cent.

Tophi were present in the ears in 12 cases, or 35.1 per cent.

As to painful points: There were 38 instances of inflammation of the knees. In every one of these cases, without exception, the points of greatest tenderness on pressure were on the condyles. The more acute the inflammation, the more distinctly is this tenderness pronounced. In the decline of the inflammation tenderness will persist there when it cannot be elicited elsewhere. This is in marked contrast with acute

¹ Read before the American Association of Physicians, Washington, May 1, 1896.

rheumatism, in which, as we shall see, increased tenderness on the condyles, as compared with the other parts of the joint, was not once found.

Of 23 cases of inflammation of the ankles, the points of greatest tenderness were found on the malleoli in 11, just below the malleoli in 10, and on the astragalus in 2. †

On the great toe no uniformity in points of greatest tenderness was made out.

The hip-joint was affected in two cases, but without any localized tenderness to pressure in either.

In the upper extremity, among the numerous phalangeal finger-joints affected, and in many instances distorted with gouty deposits, those of them which were painful enough to give indications showed, without exception, the points of greatest tenderness on the condyles—that is, on transverse pressure; while pressure between the dorsal and palmar surfaces did not occasion pain, or very slight pain, compared with pressure on the condyles. I have found this in private practice a valuable sign, in women especially, as these joints are frequently in them the only ones involved in gouty inflammation.

The elbows were affected in 12 cases. Of these the most tender points were on the condyles in 6, on the olecranon in 4, and on both the condyles and the olecranon in 2.

The shoulders were involved in 5 patients. In 2 of them both shoulders were attacked. No particular point of tenderness was noted except in 1, and that was on the acromion.

The cases of inflammation of the metacarpo-phalangeal joints were not enumerated, because their lateral tender points cannot be isolated. The same applies to the wrists, but in both cases of these joints there is more tenderness to lateral pressure than in rheumatism.

RHEUMATISM. Number of cases of rheumatism observed, 49. All of them hospital patients. Males, 32; females, 17.

Among these the heart was or had been affected in 18, or 36.7 per cent. Tonsillitis occurred shortly before or during the attacks in 11, or 22.4 per cent. Pleurisy occurred in 3 cases, or 6 per cent.

The pulse is reported as of low tension, or compressible, in 42, or 85.7 per cent.; of high tension in 5, or 1.02 per cent.; and in 2 not stated.

The first attack was polyarticular in 46, or 94 per cent.; monoarticular in 3, or 6 per cent.

In rheumatism, particularly when a joint is acutely inflamed, there is usually more superficial or cutaneous tenderness than in gout. This may mislead as to the existence of special points of tenderness unless the examination be made with special reference to this subject, when in the great majority of instances, notably in some joints, rheumatism will be found to be scarcely less specific than gout in the localities of greatest pain on pressure, and, what is equally important, that these are in only a few

joints the same as in gout. Thus, in the knee, the typical points of tenderness are on the tendon of the quadriceps just above the patella, and below it also at the tendon insertion. Posteriorly equally characteristic points of tenderness are found along the tendons of the hamstring muscles. Out of 58 cases of inflamed knees in my list, 53, or 91.4 per cent., were thus typical, and in 5, or 8.6 per cent., the pain was uniformly diffused over the joint. In no case were the condyles the seat of most tenderness.

Rheumatic inflammation of the ankles is not so distinctive in the location of painful points as in the case of the knees. Of 32 cases my notes are that the most pain was elicited by pressure on the tendons of the dorsal aspect of the joint in 20, or 64.4 per cent. This pain, however, is not so pronounced as in the tendons of the quadriceps and hamstring muscles of the knees. In 3 cases, or 10.6 per cent., the most painful points were under the malleoli; and in 8, or 25 per cent., there was no specialized place.

The hips were affected four times, but no localized pain was noted in either.

Of the joints of the upper extremity, the shoulders were affected in 20 cases. In only one of these was a special tender point found on the coracoid process.

The elbow was affected in 13 cases. Of these in 9, or 70 per cent., the most painful point was elicited by pressure on the triceps tendon. In 4, or 30 per cent., there were no special points.

The wrists were affected in 24 cases. Of these the most pain was elicited by pressure on the tendons of the dorsal and palmar aspects in 20, or 83.3 per cent. It was uniformly diffused in 3, or 15 per cent.; and one case complained of most pain on transverse pressure, as in gout.

In every case noted of inflammation of the finger-joints in the rheumatic patients the pain was localized in the tendons and not on the condyles.

Why the hips and shoulders do not commonly show specially painful points may be due to these joints being so covered by large muscles.

It seems natural to infer that the difference between these two forms of arthritis in the respects noted, of pain on pressure, is because gout chiefly affects the periosteal, while rheumatism chiefly attacks the synovial structures.

With the exception of the hips and shoulders, therefore, it would seem that the distribution of pain on pressure may be often of use in the discrimination of these two articular inflammations. The ankles and wrists also do not present such marked contrasts as the more simple joints, apparently from the greater number of bones entering into the formation of these articulations.

ON THE FUNCTIONS OF THE NEURON,

WITH ESPECIAL REFERENCE TO THE PHENOMENA PRESENTED BY
HYSTERIA AND HYPNOTISM.

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THERE has been noticeable of late years a tendency strangely to misconstrue the structure of the nervous system and to misinterpret the truths which that structure teaches. Curiously enough, this tendency has appeared with our increasing knowledge of the details of the intimate structure of the neurons and of the relations which they bear to each other. It is known, for instance, that the afferent fibres, those which convey impressions from without up to the cortex [themselves processes (axons) of peripheral neurons], terminate not in nerve-cells, but in the uppermost layer, the so-called molecular layer or molecular plexus of the cortex. Here in some way the minute divisions of the afferent fibres affect the fibres of this molecular plexus. The latter are in turn in direct communication with the nerve-cells of the cortex, are, in fact, themselves cell-processes. These facts suggested the idea that afferent impulses are diffused through the molecular plexus without involving or affecting the nerve-cells at all, and according to this interpretation the nerve-cells are left out of consideration entirely in studying nervous phenomena. This view has been especially advanced by Nansen, who maintains that the old manner of view relative to the composition of the reflex arc and the physiological importance of the nerve-cells can no longer be sustained, inasmuch as the cells are not in direct communication with each other, and because direct communication between the central nerve-cells and the sensory or centripetal nerve-fibres is equally lacking. The reflex arc is constituted, according to Nansen,¹ first, by the centripetal nerve and its fibrillary ramifications passing directly into the nervous meshwork of the cortex—that is, into the molecular layer; secondly, by the propagation of the excitation through this molecular plexus; thirdly, by the transmission of stimuli to the minute lateral branches of the centrifugal or motor nerve-fibres. It follows that impulses are transmitted to the superior centres without passing directly through the nerve-cells. “We can admit in the same manner,” continues Nansen, “that the voluntary impulses emanating from the nerve-fibres which emerge from the superior centres transmit themselves directly to the centrifugal fibres of the inferior centres without passing through the nerve-cells of these centres.” He says, further, that it is

¹ Soury, *Les Fonctions du Cerveau*, p. 316.

impossible to admit that the nerve-cells of the inferior centres possess a direct importance either in relation to reflex movements or to the voluntary movements, and that this seems to apply equally well to the nerve-cells of the superior centres. This view forces us to the conclusion that the activity of the nervous system, intelligence, consciousness, etc., is seated really in a fibrillary meshwork of the cortex, the molecular layer, and has nothing to do with the nerve-cells of the cortex. The latter, indeed, deprived of their psychic functions, become simply "trophic" centres. They serve only for the maintaining of the nutrition of the nerve-fibres and their innumerable arborescent ramifications.

This view of Nansen's has been adopted by my esteemed colleague, Dr. Mills, who, in a discussion on cerebral localization at the last meeting of the American Neurological Association, and also in the *Text-book on Nervous Diseases by American Authors*, has maintained this position; he holds that "impulses are conveyed from processes to processes through the entire reflex arc, through the entire length of a cortico-efferent, or a cortico-afferent, projection-system," without passing through nerve-cells, and that "the function of the nerve-cell body is trophic;" that its "nuclei and nucleoli preside over the nutrition of the long or short fibres which pass out of or grow into them;" and, further, that cells are of enormous bulk in order that they may be able to sustain these processes. In his words, "the aggregations of gray matter at various levels of the nervous system are watering- and feeding-places, not places for renewing nerve-activity."

Certainly this view does violence to the fundamental principle that the properties of a given tissue depend upon its cells, and that the cells are the integral parts of the tissues. Nowhere in the whole range of biology do we find a similar anomaly obtain as is implied by this view. It asserts that merely incidental structural attributes are of greater value than the individual cells, whose building up constitutes the tissue. Surely there is here an intrinsic contradiction.

Not only upon general principles is this view untenable, subversive of all that we have hitherto learned; but, if carefully analyzed, it is found to present insuperable difficulties. If it be true that a nerve-fibre diffuses the energy which it conveys: in a general way, scatters it though all the fibres or nerve-cell processes near which it happens to lie, it becomes impossible to explain the definite and precise actions of the nervous system, properties which are so characteristic of it. Nothing but hopeless confusion of function could result if such a thing were possible. It would mean that nerve-currents course indiscriminately without relation to each other through this network of fibres. It would mean that everything that had been done by nature to conserve and isolate nervous impulses by enclosing the nerve-fibres in special sheaths of insulating material previous to their entrance into the cortex had, after all, no purpose,

because in the end the currents are turned wildly loose into a common receptacle.

The conservation of nerve-currents along cell-processes, no matter how long these may be, or whether they be in the cortex or below it, is an absolute requisite. Were it not so, the various commissural and association tracts, whose existence we know of upon anatomical as well as upon physiological grounds, would assuredly be unnecessary, would have no meaning if the loose and unrestrained diffusion of nervous energy in the cortex, such as is implied by Nansen's view, were possible.

Further, such facts as we possess are directly opposed to a diffusion of nervous energy. According to Berkley,¹ by far the larger number of the finer fibres of the cortex are medullated almost to the extremities of the end-terminations. It is highly probable that Berkley maintains "that in no instance except at the free termination is there actually such a thing as a naked axis-cylinder," and that "the conduction of the nerve-force from cell to termination and from termination to cellular protoplasm again is only through the medium of the ending of the nerve-fibre, and that there is no diffusion of the dynamic forces through the cortex, but that the action is a direct one." In this connection he further says: "To suppose for an instant, that naked axis-cylinders are present in considerable numbers in the cortex is to me an impossibility, for we must necessarily suppose in such an event that in the closely packed arrangement of axons and dendrons presented by the outer portion of the pyramidal and in the molecular layer, where fibres and dendrites touch each other in all directions, the stimuli would quite as often be aberrant as direct, and as frequently reach the wrong as the right destination. Naked axis-cylinders are in all likelihood a physiological impossibility in the cerebrum, for were they numerous we can suppose nothing but a constant overflow of stimuli from one cell to another, and consequent inco-ordination, not only of thought, but also of action."

Far from lending support to the view of Nansen, that the cell is to be left out of account in the consideration of nervous action, the discoveries of Golgi, Ramón Cajal, Van Gehuchten, and others have shown exactly the reverse. They have demonstrated beyond all question that, as in all other tissues, the cell is the actual integral structure. And while it was formerly held that the various cell-processes anastomosed freely with each other, we now know as a matter of fact that such anastomoses do not occur. The nerve-cell is a cell entirely by itself. It is a cell as distinct and as self-limited as any cell of any tissue with which we are acquainted.

Far from being continuous through its processes with other cells, we learn that its processes nowhere fuse with other structures. Its processes are well limited, sharply defined, and bear no relation to those of other

¹ Medical News, November 9, 1895, p. 506.

cells save that of propinquity or perhaps contact. The individuality of the nerve-cell as a morphological integer is wholly preserved.

If we grasp this idea in its full meaning, our conception of the nervous system changes profoundly. It is no longer a stringing together of telegraph wires and way stations, but it consists of an aggregation of cell-integers, each one of which does its share in the production and in the transmission of nervous energy. For instance, the impulse proceeding from a motor neuron in the cortex is transmitted by the neuron through its own protoplasmic extension (the efferent nerve-fibre) to a definite aggregation of cells in the spinal cord. It communicates its energy to these cells in the spinal cord without in any way fusing with their protoplasm or their processes. In the same way the impressions that come by the various sensory paths come from peripheral neurons, those situated in the skin, in the retina, in the ear, in the taste-buds, or in the Schneiderian membrane, and are conveyed by fibres which are merely protoplasmic extensions of these peripheral neurons up to the cortex. Here in turn these fibres transmit the energy they convey to the cortical neurons without fusing with the latter or with their processes. Everywhere, and no matter in what light we view the nervous system, the signal importance of the nerve-cell as an individual entity is strikingly apparent.

A consideration of the above facts has suggested to me the following thought: Can it be that the neuron is not an absolutely fixed morphological element? Can it be that it possesses a certain, though perhaps limited, power of movement? Realizing the practical value and the wide application of this idea, I have examined the literature to see whether a similar interpretation of nervous phenomena has occurred to others, and to gather such facts, if any, as could be brought forward in its support. I found that this thought had occurred independently to three observers, one in Germany and two in France. I found that in 1890 Rabl-Rückhard, in a short paper published in the *Neurologische Centralblatt*, had suggested the view that nerve-cells have an amœboid movement, and he also hinted briefly at the possible significance of such a fact, if true, upon our interpretation of the phenomena of hysteria. Rabl-Rückhard's ideas attracted little or no attention, and in August, 1894, without any knowledge of Rabl-Rückhard's theory, in a paper on "A Case of Hysteria of Peculiar Form," published in the *Revue de Médecine*, Lepine advanced the same view. In endeavoring to interpret the various shifting phenomena observed in his patient he advanced the idea that the neurons were capable of movement to such an extent as to enable them to vary the degree of their relation to each other. About half a year later Mathias Duval, without any knowledge of either the views of Rabl-Rückhard or those of Lepine, in a communication made to the Société de Biologie, advanced the same theory. A week later Lepine, before the same body, repeated his former arguments in its support.

Curiously enough, this view, so suggestive, so pregnant with possibilities, did not meet with the indorsement either of that veteran histologist, Kölliker, or that other high authority, Ramón Cajal. In a paper entitled "Some Conjectures on the Anatomical Mechanism of Ideation, Association, and Attention," published in the *Revista de Medicina y Cirugía Practicas*, May 9, 1895, Ramón Cajal contended that the nerve-cells do not move, because (1) the terminal branches of the nerve-cells of the cerebellum, of the olfactory bulb, of the acoustic ganglia, optic lobes, etc., always present the same shape and the same degree of approximation to the cell-bodies irrespective of the mode of death of the animal (chloroform, hemorrhage, curare, strychnine, etc.); (2) because the terminal nerve-branches of the retina and of the optic lobes in reptiles and batrachians presented always the same appearance, no matter whether the organs mentioned had remained in a condition of rest (the animals having been killed after remaining in darkness for a long time) or whether they had been functionally active (the animals being killed after prolonged exposure to sunlight).

While Ramón Cajal thus opposes the theory of mobility of the neuron, he maintains, on the other hand, that the neuroglia-cells possess a great degree of mobility. He points out, for instance, that the neuroglia-cells of the cortex are at times stellate and at others much elongated. Their processes have numerous short, arborescent, and plumed collaterals. Two phases can be observed in them: first, a stage of contraction, in which the cell-body becomes augmented while the processes become shortened and the secondary branches disappear; secondly, a stage of relaxation, during which the processes of the neuroglia-cells are again elongated. Ramón Cajal maintains that the processes of the neuroglia-cells in reality represent an insulating or non-conducting material, and that during the period of relaxation they penetrate between the arborizations of the nerve-cells and their protoplasmic processes, and render difficult or impossible the passage of nerve-currents. On the other hand, when the processes of the neuroglia-cells are retracted, the various nerve-cell processes which they formerly separated from each other are now permitted to come into contact. To me it seems as though Ramón Cajal admits the very thing against which he contends. Evidently, if the nerve-cell processes are not at one time in contact, and at another are in contact, they must certainly move, and the question at issue is self-admitted. It certainly does not matter whether the nerve-cell processes move little or move much, but that they move at all is the question at issue; and this, it seems to me, Ramón Cajal admits, although he makes that movement a purely passive one and dependent upon the interposition of the processes of the neuroglia-corpuseles. It is certainly a minor point whether the movement of the nerve-cell processes is active or passive, though it seems that it is far from evident, from the histological facts at our

disposal, that the neuroglia-corpuses play the rôle of an insulating material. To me it further seems that a single positive observation outweighs all other negative observations, no matter how great the authority behind them, and this positive observation has actually been made. Wiedersheim¹ actually saw in the living animal, *leptodora hyalina*, an entomostracan, the nerve-cells in the œsophageal ganglion move. The œsophageal ganglion may in one sense be regarded as the brain of the animal, inasmuch as it receives the fibres of the optic nerve, and Wiedersheim saw its cells move and change their shape. He describes their movement as slow and flowing. Certainly this observation possesses a profound significance. Even if the animal in which the phenomena were observed is far removed from the vertebrates, it must be remembered that it is just in the lower forms that general biological truths must be sought for, and it is just in the lower forms that they have been found. I do not for a moment contend that the nerve cells of vertebrates possess a gross amœboid movement as in the œsophageal ganglion of the entomostraca; but I do contend that it is in the highest degree probable that such facts as we have, scanty though they be, are in favor of the view that a certain amount of movement does take place in the terminal portions of their processes, their dendrites and their neuraxons, although this movement is probably small in extent.

Let us turn our attention for a moment to the subject of hysteria, and let us see what a flood of light is cast upon this subject, heretofore so obscure and mysterious. Let us take the simple example of a hysterical paralysis, and see how easily it is explained. The neurons of a certain area of the cortex, for instance, retract the terminal branches of the neuraxon to such an extent that the latter are no longer in contact, or sufficiently near to the neurons of the spinal cord which supply the muscles of the paralyzed part. It explains also the marvellous fact that a hysterical paralysis may at one time be so real, so genuine, as to be indistinguishable from a grossly organic paralysis, and yet the next moment upon a suggestion may absolutely disappear. The shifting of symptoms in hysteria, this sudden disappearance of paralysis or anæsthesia, can be explained by the view here advanced as it can be by no other. When power is suddenly re-established in a hysterically palsied limb it simply means that the terminal branches of the cortical neuraxon, previously retracted, are again extended so as to re-establish the proper relations with the spinal neurons. Take again the example of a hysterical anæsthesia. How often do we see a segmented anæsthesia or a hemi-anæsthesia coming and going under the influence of no other stimulus than that which applies to the psychic make-up of the individual, namely, a treatment which we call mental or moral treatment, or

¹ Anatomischer Anzeiger, 1890, p. 673.

that more powerful treatment, suggestion under hypnotism. It would be interesting, indeed, to follow out the ideas here brought forward in their application to the various phenomena presented by hysteria, its sensory, motor, and visceral stigmata. Even the hysterical convulsion, I contend, can be explained by the view here advanced. Time will not, however, permit more than to indicate the line of thought.

When we turn to hypnotism we can see what a ready explanation it affords for the phenomena presented. Under the fixed stare necessitated by the ordinary method of bringing about hypnosis, and under the suggestion of sleep, the neurons are thrown into certain fixed relations with each other, corresponding solely to the ocular strain and singleness of thought induced. At the same time such relations of the neurons as ordinarily bring them into true contact with the outer world are suspended, probably by retraction of cell-processes. We can easily understand, in the light of the theory here advanced, how under hypnotic suggestion a hysterical paralysis disappears, or how, under hypnotic suggestion, anaesthesia is produced in this or that part of the body. Further, the various stages of hypnotism itself—lethargy, catalepsy, somnambulism—are all of them capable of a scientific explanation upon this theory. Hypnotic lethargy, for instance, a stage so easily produced in the majority of patients, merely signifies that so general has been the retraction of the cortical neurons from each other that not only is sleep produced, but also a stage of general motor relaxation, due to the retraction of the terminal branches of the neuraxons in the spinal cord. In hypnotic catalepsy, on the other hand, the reverse obtains. Here the relations of the cortical neurons to the spinal neurons (contact or increased proximity, whatever it may be) are established to a degree beyond that which is normal, and the consequence is an enormous general increase of muscle-tonus. In somnambulism, again, certain of the neurons, especially those which stand in direct relation with the various sensory organs, form partial combinations with a limited number of other cortical neurons, so as to produce the various limited psychic phenomena characteristic of somnambulism, whilst the great bulk of the neurons of the cortex, the summation of whose action constitutes the ego and brings it into close relation with the outer world, have their processes retracted in sleep.

Leaving this interesting field, let us see for a moment of what enormous value this interpretation of cortical action is for normal mental phenomena. Sleep, instead of resulting from brain anaemia, or some other apocryphal condition of the circulation, merely means that when the substance of the cortical cells has been diminished by functional activity, which diminution we have reason to infer, from the researches of Hodge,¹ (on the changes in nerve-cells in fatigue), there comes a time

¹ *Journal of Morphology*, 1892, vol. vii p. 95.

when the cell-processes are retracted, so that the neurons no longer stand in active relation to each other. Interchange of action cannot then take place; unconsciousness follows; sleep is established. Spontaneous wakening merely means that after nutrition has reached a certain point, a point where the wasted cell has been replenished, extension of the cell-processes again takes place, and interchange of active functional relations is re-established.

Numerous other ideas also suggest themselves in relation with the view here advanced. Take, for instance, a train of thought. This appears to follow *purely mechanical* lines. Thus a sequence of sound-vibrations impinging upon the peripheral auditory neurons, the auditory cells, produces in them a change, which in turn affects the relations which their neuraxons bear to the auditory nuclei, and secondarily to the auditory cortical neurons. Not only are the latter affected by the impressions received from the afferent neuraxons, but they in turn react in such a way as to change their relations to each other, and the new positions assumed by them will depend largely upon the fact as to whether a similar sequence of impressions has passed through them before. If so, the old combinations will be reformed, and as a corollary the recognition by the ego of the sounds as something heard before. From the cortical auditory centre there now passes through the general cortex a series of combinations among the neurons, also along the oldest and best-travelled lines, so that a given sequence of musical sounds may suggest at first a familiar air, and a moment later a vivid recollection of an opera once heard and seen. Here is the physiology of memory.

A startling thought which also suggests itself in connection with the theory of cortical action advocated in this paper is that *not all of the neurons are functionally active at the same time*. It is exceedingly probable that the number varies greatly. For instance, in fatigued states fewer combinations are made—fewer are possible—because of the exhausted condition, the diminished volume of the cell-protoplasm. After rest, on the other hand, not only are combinations more readily made, but a larger number of neurons are active. It is further probable that in states of mental or emotional excitement the number of neurons that are active and the number of combinations accordingly formed enormously exceed those occurring during ordinary mental states.

Many other thoughts also suggest themselves, and some are extremely interesting. For instance, the receptivity and marvellous adaptability of youth and early manhood appear to depend upon the relatively great mobility of the cell-processes, while the retarded and restricted mental action so often seen in old age appears to be related to a much diminished mobility of these processes. Certain it is that the theory that the neuron is not an absolutely fixed morphological element renders clear and comprehensive many of the well-known facts of mental physiology. The

application of this theory, for instance, to memory, sequence of thought, association of ideas, and even more complex mental processes, is evident, but the limits of this paper have forbidden any but a mere mention of them.

EXTRAUTERINE FŒTATION.

REPORT OF FIFTEEN CASES TREATED BY OPERATION.

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WITHIN the past four years the following fifteen cases of extrauterine fœtation have been operated on by me at the Presbyterian Hospital. The admission of so many cases to the service of one surgeon in a general hospital must indicate that an ectopic pregnancy is a comparatively common occurrence. From the histories which follow certain facts have been derived. The youngest patient was twenty-three years of age, the oldest thirty-nine. Three were nulliparæ. Twelve had previously been normally pregnant, nine having borne one or more children, three having had miscarriages only. Five had complained of more or less pelvic pain prior to the ectopic gestation; ten gave no history of special distress in their pelvic organs.

Symptoms during the ectopic pregnancy. All had suffered from pain. In three the pain had been slight, in twelve severe. All had skipped one or more menstrual periods. In fourteen there had been irregular uterine bleeding; in one there was no history of bloody vaginal discharge. In eight there had been signs of shock on one or more occasions indicating rupture, in two of these amounting to severe collapse. In seven there had been apparently no sign of shock. Seven had considered themselves pregnant; eight had not suspected the existence of pregnancy.

Conditions found at operation. In two cases the fœtus was in the tube, which was unruptured (eight weeks and ten weeks). In five rupture into the broad ligament had occurred (less than three months). In eight the fœtus or its remains was found in the peritoneal cavity. The duration of the pregnancy was under fourteen weeks in thirteen cases, over four months in two cases (four and a half and six and a half months).

It may be well to note that most of these patients were from the lower grades of life and would not be apt to pay special attention to either their menstrual dates or their signs of pregnancy, and perhaps not to pain unless it was severe in character.

It will be noticed from a review of the above symptoms that these cases emphasize the fact that the main points in the diagnosis of extrauterine pregnancy are, first, delay of the menstrual period, with or

without signs of pregnancy ; second, pain generally severe in character and sudden in its onset, sometimes agonizing, with signs of shock ; third, irregular uterine hemorrhage very commonly accompanying the first attack of pain.

Case X. is of special interest on account of the viability of the child, which was fairly robust for a six and one-half months' foetus. As both the head and extremities were deformed, an incubator was not employed. The history of this case is also of interest because of the frequent and severe attacks of hemorrhage in the cavity of the peritoneum. The placenta was removed at the operation instead of being left *in situ*, as is the usual custom.

Case XII. is of interest on account of the time selected for operation and the large amount of blood found in the abdomen. Laparotomy was done thirty-six hours after the gravest of three hemorrhages. Had the abdomen been opened on her admission to the hospital she would certainly have died on the operating-table. A delay of twenty-four hours enabled the patient to recover sufficiently to withstand the immediate shock of operation. Her depleted state was, however, unable to withstand the poison absorbed from the blood which was necessarily left in the abdominal cavity, and she succumbed on the fifth day. This was the only fatal case.

Case XIV. is of interest on account of three successive ruptures of the foetal sac, as is shown by the history of the case and by the conditions found at operation. The first rupture, that of the Fallopian tube, occurred presumably between the fifth and sixth weeks. Its contents apparently escaped into the broad ligament and a large blood-clot was left in the tube. The second rupture occurred about two weeks later. It was of the broad ligament, and resulted in a large hæmatocele in the floor of the pelvis, which evidently became sacculated. This was also accompanied by severe pain and by a uterine hemorrhage. The third rupture occurred about the tenth or eleventh week and evidently was of the sac of the hæmatocele, and resulted in either a fresh hemorrhage or an escape of the already clotted blood into the free peritoneal cavity. The conditions found at the operation, consisting of an enlarged Fallopian tube, in the end of which was a cavity in which the foetus had formed, the distended broad ligament showing a tear in its superior layer, the hæmatocele in Douglas's pouch with a rent in its fragile sac, and the free blood in the peritoneal cavity, form a chain which beautifully illustrates the history of the three ruptures, each one of which was accompanied by pain and "flow."

CASE I.—Mrs. D., aged thirty-seven years ; married ; one miscarriage, six years ago ; no children. Menstruation regular and painless. Last normal menstruation November 1, 1891. Considered herself pregnant until January 27, 1892, when she thought she had a miscarriage, as

there was sudden uterine hemorrhage lasting some days, accompanied by pain, and followed by severe "colic" which continued two or three days. From February 5th until February 20th felt well, but was then attacked with another "colic" and with vomiting. In a few days these symptoms disappeared, but there remained a continuous pelvic pain. A week later another "colic," and again in another week. Admitted to the hospital on March 14th: Temperature 100°; pulse 92. There had been no vaginal discharge since February 1st. Complained of general abdominal discomfort and enlargement. On examination, to the right of the uterus was a mass the size of a foetal head. Diagnosis—probable extrauterine pregnancy, which had ruptured.

Operation, March 16th. Ether. Median laparotomy. Omentum found tightly adherent to superior surface of tumor and to intestines; ligated in three portions and cut away. Tumor then seen to occupy right iliac fossa and to be adherent to uterus, intestines, and floor of pelvis. It consisted of a thin sac, which was situated in the general cavity of the peritoneum. It was filled with blood-serum, and in it was a four and a half months' foetus, cord, and placenta. Sac was ruptured; contents removed with moderate loss of blood. Sac peeled from its attachments with ease. The distended and thickened Fallopian tube ligated and removed. The abdomen closed by suture. The patient made a good recovery, was out of bed April 12th, and discharged cured April 20th.

CASE II.—M. H., aged twenty-seven years; married five years; no children; one miscarriage (second month) four years ago. With the exception of the abortion, never suffered from pelvic pain until present illness. Menstruation always regular and painless. Last normal menstruation March 11, 1892. April 10th, menstrual moolimina for two days, but no flow; noticed fullness of breasts and occasional nausea. May 7th, colicky pain in abdomen, which became localized into a constant pain, or rather a sense of discomfort, in the left iliac fossa. May 10th, when an examination was made a mass the size of a large orange, somewhat soft to the touch and slightly sensitive to pressure, was felt in the left of the uterus; uterus seemed enlarged and soft. Diagnosis of probable extrauterine foetation.

Operation, May 12th. Chloroform. Median laparotomy. To the left of the uterus and adherent to it was found a mass the size of an orange, which evidently contained fluid and blood-clots. On separating it from the adhesions it was seen to be a distended Fallopian tube. Partial rupture with the escape of some bloody serum occurred in extirpating the tube, which was clamped close to the uterus. Clamp was replaced by a ligature, and after cleansing of the pelvis the abdominal wound was closed. In the sac was found a shrunken foetus seven to eight weeks old. The temperature of the patient did not rise above 99.5°, and she was out of bed on the nineteenth day, and was discharged cured on June 7th.

CASE III.—C. P., aged thirty years; married ten years; four children, last four years ago. Menstruation had been regular. For the past four years had suffered from dysmenorrhœa and pain in the right side. Last normal menstruation in the middle of August, 1892. At the next menstrual period, September 15th, the flow was profuse and continued more or less until her admission to the hospital on November 1st. During these six weeks she suffered from abdominal pain, frequently severe in character, and from fever every afternoon and evening. No suspicion of pregnancy. On admission morning temperature averaged 99°; evening

temperature 101°. Uterus was enlarged and attached to its right side, and posterior to it was a tumor the size of a cocoanut. Diagnosis of probable extrauterine pregnancy.

Operation, November 4th. Ether. In a preliminary examination of the patient by bimanual palpation for diagnostic purposes the tumor was felt to rupture and disappear. This rupture confirmed the diagnosis, as but slight force had been employed. Patient placed in Trendelenburg position and the abdomen opened by a median incision. In the right broad ligament and escaping from it through a tear in its posterior wall were found fluid and clotted blood sufficient to fill a ten-ounce measure, and there were also shreds of tissue which afterward on microscopical examination were found to contain chorionic villi. The right Fallopian tube was enlarged and thickened, and with the ovary was removed. After careful sponging of the cavity the peritoneal cavity was irrigated with salt-solution, a strip of iodoform-gauze inserted for drainage, and the abdomen closed. Recovery was uncomplicated. The gauze was removed on the fifth day. The patient was out of bed on the twenty-fifth day and was discharged cured December 8th.

CASE IV.—O. G., aged thirty years; married ten years; three children, last fifteen months ago. Menstruation had been regular and free from pain. Last normal menstruation in beginning of September, 1892. After skipping period about October 1st, she considered herself pregnant and was "treated" by a midwife, the result after the second local treatment being severe pelvic pain and a slight bloody vaginal discharge. This continued, together with a feeling of discomfort referred to the rectum, from October 15th until November 14, 1892, when she was admitted to the hospital. On examination a mass the size of an orange was found behind and to the left of the uterus. No tenderness on palpation. Diagnosis—pyosalpinx or extrauterine pregnancy.

Operation, November 15th. Ether. Median laparotomy. Mass was situated in left broad ligament, and was found to consist of a blood-clot and shreds of organized tissue. Left tube much enlarged and adherent to the sac, which, with the left tube and ovary, was removed. Abdomen irrigated and closed by suture, a strip of gauze being inserted for drainage. The patient was out of bed at the middle of the fourth week and was discharged cured December 25th. Fœtal villi found on microscopical examination.

CASE V.—R. I., aged thirty-three years; married; five children; three miscarriages. Menstruation regular and no complaint of pain until present illness. Last normal menstruation October 11, 1892. Skipped period in November; breasts swollen; suspected pregnancy. December 13th, severe cramp-like pains in right side, followed by expulsion of large clots from vagina. Patient remained in bed; had fever, and flow continued. Admitted to the hospital December 19th, complaining of severe pain in right side; temperature 101.5°; pulse 100. On examination a doughy, tender mass the size of a fist felt to the right of the uterus, which was immovable. Diagnosis—pyosalpinx or extrauterine pregnancy.

Operation, December 12th. Chloroform. Median laparotomy. Mass to right of uterus proved to be a distended Fallopian tube adherent to intestines and uterus. In separating it from the adhesions the tube ruptured and gave exit to an ounce or two of dark grumous blood and some organized tissue, which on microscopical examination was found to contain chorionic villi. Tube extirpated with ovary. Left tube found

to contain a few drops of pus, also removed. A strip of iodoform-gauze inserted behind right broad ligament and brought out through abdominal wound, the remainder of which was closed. December 27th, gauze removed, rather foul. January 20th, patient out of bed. Sinus healed slowly and did not close until April 1st, but patient was discharged from hospital on February 10th.

CASE VI.—R. Z., aged thirty years; married six years; one child; seven miscarriages. Had been curetted several times. Four years before suffered from an attack of pelvic peritonitis, which followed a severe uterine hemorrhage. Since that time menstruation regular and no complaint of pain until present illness. August 15, 1893, another severe hemorrhage, and again followed by the use of the curette; in bed for a few days, but back at work in a week. Felt comparatively well until September 12th, when she was seized with severe pain in right iliac region, followed by a chill, fever, and sweating. These symptoms continued until September 30th, when she was admitted to the hospital; temperature 101.5° ; pulse 114. Complained of pain and tenderness in right iliac region. Uterus retroverted and immovable. In right broad ligament a fluctuating tumor the size of a large orange; a smaller one on the left. Diagnosis—extrauterine pregnancy. October 1st to 10th, temperature ranged between 100° and 102° . From the 10th to the 17th it remained normal. From the 18th to the 26th it ranged between 99.5° and 100.5° . Constant pain in right side.

Operation, October 26th. Chloroform. Trendelenburg position. Median laparotomy. To left of uterus a mass the size of a cocoanut found firmly adherent to uterus, to walls of pelvis, and to intestines, and which apparently consisted of a distended broad ligament. Rupture occurred in separating the adhesions and eight ounces of offensive bloody fluid escaped. Left Fallopian tube enlarged, and, with the ovary, removed, two clamps being left on the pedicles. Cavity cleansed, packed with gauze, and abdominal wound partly closed. Considerable shock followed, but patient rapidly rallied. November 2d, packing removed; convalescence uninterrupted. November 20th, out of bed. December 2d, discharged cured.

CASE VII.—E. B., aged twenty-three years; married two years; never pregnant. Menstruation always painful and rather irregular. Since marriage more or less sense of discomfort in right inguinal region. During the spring and summer of 1893 continuous pain in this region. August, 1893, on examination I found a mass to right of uterus and adherent to it the size of a billiard-ball and very sensitive. Last regular menstruation in end of July. September 15th, slight bloody vaginal discharge; mass increasing in size. November 1st, pain more severe; mass larger, very tender; occasional "flow;" breasts tender; some vomiting. Diagnosis of intra-ligamentous cyst, and operation advised. Patient losing flesh and strength rapidly; no fever. For the next two weeks pain and tenderness increased and general condition worse. No further flow. Possibility of extrauterine pregnancy considered, but diagnosis inclined to tubercular salpingitis.

Operation, November 14, 1893. Chloroform. Trendelenburg posture. Median laparotomy. To the right of uterus spongy mass the size of a goose-egg, consisting of Fallopian tube, ovary, and broad ligament, surrounded by firmly adherent intestines. With considerable difficulty and much hemorrhage entire mass extirpated piecemeal, as it was so

brittle and so adherent. Many ligatures employed. Tampon of gauze placed in the cavity from which the tumor had been removed. Abdomen partly closed. On examination mass consisted of enlarged and much-thickened tube, of part of broad ligament, and remains of fetal tissue. Considerable shock. Slow convalescence. Discharged December 17th, with deep, narrow sinus, which persisted for months.

CASE VIII.—J. M., aged thirty-one years; married; three children; one miscarriage; last child three years ago; miscarriage eleven months ago, followed by a curetting of uterus. With these exceptions no complaint of pelvic pain or history of disease in pelvic organs. Last regular menstruation January 10, 1894. Skipped period due on February 8th. Morning nausea and fulness of breasts. Considered herself pregnant. No pain and no flow until March 10th, when after a hard day's work felt severe colicky pain in right iliac region and noticed a slight show. Remained in bed twenty-four hours, when pain ceased, and again moved about the house, but complained of a sense of discomfort in the right side of pelvis. March 18th, another attack of pain, not very severe, and described as "tearing" in character; a slight bloody vaginal discharge accompanied the pain, and as these continued she consulted Dr. S. Graber, who made the diagnosis of extrauterine pregnancy and sent her into the hospital for operation. Admitted March 23d, temperature 99.5°; pulse 90; abdomen not distended and not tender except on deep pressure in right iliac region, where, on vaginal examination, was felt a boggy mass to the right of the uterus the size of an orange, and it seemed adherent.

Operation, March 24th. Chloroform. Trendelenburg position. Omentum adherent to fundus of uterus and to top of right broad ligament. Uterus enlarged, position good. In right broad ligament a semi-fluctuating mass the size of an orange, somewhat adherent to floor of pelvis and to small intestine. In endeavoring to enucleate this tumor it ruptured and gave exit to an ounce or two of semi-solid blood and a small oblong solid mass of organized tissue, which was afterward found by the microscope to contain chorionic villi and remnants of a fetus. The sac consisted of the layers of the broad ligament, with an enlarged and ruptured Fallopian tube forming the roof. The latter, with the ovary, was removed, the cavity carefully cleansed, the layers of the broad ligament sutured, and the abdomen closed. Convalescence uneventful. Out of bed on the twentieth day, and discharged cured on April 20th.

CASE IX.—A. S., aged twenty-eight years; married ten years; never pregnant. Menstruation normal, slight pain. Eight years before, mild attack of pelvic peritonitis. Since then six or eight similar attacks, the last one a year ago. Last normal menstruation February 15, 1894. Skipped period in March and considered herself pregnant. April 10th, severe cramp-like abdominal pain, especially in left inguinal region, followed by slight "flow." The pain increased in severity, the abdomen became very sensitive, and the flow continued. On April 18th she was admitted to the hospital. Temperature 99.5°; pulse 100. On examination a doughy mass, sensitive to pressure, was felt behind the uterus, which was crowded forward and to the right. Abdomen slightly tympanitic and tender. Diagnosis—probable extrauterine pregnancy.

Operation, April 20th. Chloroform. Trendelenburg position. Median laparotomy. To the left of uterus and behind it a mass the size of a duck's egg, adherent to floor of pelvis and to intestines. In separating

this a rupture took place and a blood-clot with some shreds of tissue escaped. The Fallopian tube was enlarged and adherent to the right wall and roof of the sac, which, with the tube and ovary, was removed. Several silk ligatures used. Cavity cleansed. Abdomen closed without drainage. Convalescence rapid. Out of bed on the twenty-first day, and discharged cured May 19th.

CASE X.—M. B., aged thirty-five years; married seven years; one child five years ago. No miscarriages. Menstruation has always been regular. Has complained of no pain in pelvic organs until present illness. Last normal menstruation in the middle of February, 1894. At next menstrual period, March 15th, the flow was very profuse and continued for twenty-five days and was accompanied by dull pain. This was followed by a foul vaginal discharge which continued until May 1st, when she was seized with a uterine hemorrhage and was taken to a hospital, where for ten days she suffered from frequent vomiting, severe abdominal pain, and tympanites. On May 12th there was sudden attack of severe pain in the right inguinal region, followed by vomiting and collapse. A foul vaginal discharge persisted, until June 1st, when, being somewhat improved, she was removed to her home. On July 9th she was admitted to the medical side of this hospital. Abdomen was swollen; she vomited frequently and suffered from more or less constant abdominal pain. On July 17th she was transferred to the surgical division for operation. Abdomen much distended, giving on palpation a feeling of irregular bogginess, especially to the right of the median line, where in the lumbar region could be felt a hard mass which proved to be a fœtus. Temperature 100.5°; pulse 100.

Operation. Chloroform. Abdomen opened by median incision. Omentum adhered to abdominal wall and to the agglutinated intestine beneath. On separating adhesion a large quantity of dark blood poured out, and the peritoneal cavity was found to contain an enormous quantity of blood, both in clots and fluid, certainly as much as could be contained in a two-quart measure. Clots were adherent to the intestines, and as they were removed considerable bleeding followed. The mass which occupied the right half of the abdomen was a fœtus, with its placenta apparently encysted among adherent intestines. The placenta was implanted partly on intestines and partly on the lower border of the liver. The head of the fœtus was pressed against the under surface of the liver. The hemorrhage following the separation of the agglutinated intestines was severe. The live fœtus was rapidly removed and the cord clamped. As there was no sign of cessation of the hemorrhage, which was venous and seemed to issue from all parts of the sac, the placenta was rapidly separated from its attachments and removed. This was accompanied by a tremendous hemorrhage, which was controlled by strong compression with gauze-pads, and by a few clamps which grasped the large veins. The right tube, enlarged and thickened, was removed. The abdomen was irrigated with hot water. Numerous gauze-strips were used as packing to control the bleeding, with the ends projecting through the abdominal wound, which was then partly closed. The loss of blood had been excessive and the shock was profound, but the patient rallied well, and at the end of forty-eight hours was in fairly good condition. The gauze was removed on the fifth day and the patient was out of bed at the end of the fourth week, and was discharged cured September 9th. The fœtus moved and breathed vigorously; it was apparently about six and one-half months old. The

head was deformed and both legs were crooked. It was not placed in an incubator, and died at the end of a few hours.

CASE XI.—K. K., aged thirty-two years; married eleven years. Never pregnant. With exception of an attack of pelvic pain five years before, no complaint of uterine or ovarian trouble until present illness. Last normal menstruation July 8, 1895. July 15th, seized with severe pain in pelvis which continued for two days. August 6th, bloody vaginal discharge for six days, accompanied by slight pain. August 20th, attack of severe pain and return of "flow." Pain and flow continued more or less constantly until her admission to hospital on September 12th. Pain described as cramp-like, mainly on right side. Temperature 100° to 100.5° ; pulse 80 to 100. On examination moderate abdominal distention and a boggy, ill-defined mass was felt extending out of pelvis well above its brim and as high as the right anterior superior spine of ilium. Diagnosis—probable extrauterine pregnancy. Immediate operation advised, but refused. During following five days evening temperature ranged between 100° and 101° ; pulse 100 to 120.

Operation, September 17th. Ether. Trendelenburg position. Median laparotomy. Intestines agglutinated to each other and to the mass, which, the size of an orange, occupied the right iliac fossa, and was attached to uterus and floor of pelvis, and apparently consisted of a distended broad ligament to which were adherent an enlarged tube and right ovary. Sac ruptured; an ounce or two of bloody fluid escaped. Tube and ovary removed. Cavity cleansed and in it was placed a gauze-strip, the other end projecting through abdominal wound, the remainder of which was closed by suture. Convalescence uneventful. Gauze removed September 21st. Patient out of bed October 16th. Discharged cured October 26th.

Report of Dr. Thacher, pathologist, states: "The Fallopian tube presents a dilatation one inch in diameter near its centre. This sac has ruptured and is filled with a solid blood-clot. Microscopical examination: Villi of the chorion."

CASE XII.—D. S., aged thirty-seven years; married; three children. Last normal menstruation September 6, 1895, after which no sign of bloody vaginal discharge until the day of her admission to hospital, November 6, 1895. On October 25th she was seized with a severe attack of abdominal pain, chiefly located in the left iliac fossa, which was followed by leucorrhœa. On October 30th another sudden attack of pain, followed by syncope and vomiting. Great prostration and some abdominal pain and distention followed and continued until the morning of November 6th, when she was seized with a third attack, in which the pain was agonizing, the patient losing consciousness and continuing in a condition of collapse until her admission to the hospital in the evening of that day. In the ambulance during transfer to hospital she had several attacks of syncope in spite of active stimulation. On admission her radial pulse was almost imperceptible. Abdomen considerably distended and tender. By vagina the pelvis was found filled with a boggy mass. Diagnosis—ruptured ectopic gestation. Collapse, however, was so great that operation was for the present out of the question, as she would surely have died on the operating-table. During the night she rallied somewhat and on the next afternoon her condition was such that a laparotomy was deemed justifiable, as further delay probably meant a fresh hemorrhage. Under ether-anæsthesia in Trendelenburg position, the abdomen was

rapidly opened. As soon as the peritoneum was nicked a spout of dark fluid blood spurted out, and on enlarging the opening it was found that the abdominal cavity was full of blood, both fluid and in clots. Two quarts at least of fluid blood were washed out and clots were removed in handfuls, certainly enough to fill another quart measure. After the greater bulk of blood had been removed patient was placed in Trendelenburg position, and to the left of the uterus was seen a mass as large as a small orange, consisting of an enlarged Fallopian tube, with a rupture in its wall, and a thin, semi-transparent empty sac, also ruptured. These were removed and clamps left on the pedicles. Peritoneal cavity washed out with gallons of hot salt-solution. Irrigation could, however, not be continued until the fluid ran out clear on account of the patient's condition. Gauze was packed into the left iliac fossa and a large glass drainage-tube placed in the pelvis, and the wound partially closed. The shock of the operation was great, but the patient rallied and on the following day was in fair condition, with a pulse of 140. There was a profuse discharge of bloody fluid through the tube. Temperature 99° to 101° .

November 8th. Temperature 100° to 101° ; pulse 135 to 140. Free discharge of bloody serum. Patient looks septic.

9th. Temperature 100° to 101.5° ; pulse 130. Gauze-packing removed. Some vomiting.

10th. Temperature 100.5° to 102° ; pulse 140. Several movements of bowels. Abdomen less distended.

11th. Temperature 100° to 102° ; pulse 140. Patient weaker. No vomiting. Bowels moved.

12th. Died. Cause, exhaustion and sapræmia.

The pathologist reported foetal villi in the specimens removed.

CASE XIII.—M. C., aged twenty-six years, married seven years; no children. One miscarriage at second month, three years ago, after which uterus was curetted. Since then regular menstruation and freedom from pain until present illness. Last normal menstruation August 15, 1895. At the time of next period, September 13th, sudden profuse hemorrhage lasting a day or two, and since then more or less constant bloody vaginal discharge. Cramp-like pains in the pelvis and occasional vomiting, which continued until her admission to the hospital on October 21st, when the temperature was 99.5° and pulse 120. Abdomen distended and very tender. Mass felt most prominent on the right side, extending out of the pelvis nearly as high as the umbilicus. Diagnosis—either extrauterine pregnancy or an abscess.

Operation, October 22d. Chloroform. Median laparotomy. Trendelenburg position. Bladder found adherent to the anterior surface of the tumor and to the agglutinated intestines as high up as the umbilicus. A catheter had been passed previously to the operation, but there remained more than a pint of urine in the bladder, which was opened before it could be separated from the mass, which separation was accomplished with considerable difficulty. Tumor as large as a cocoanut found to right of uterus, firmly adherent to broad ligament and to neighboring intestines. In separating this the sac ruptured and about eight ounces of bloody purulent-looking fluid escaped. Right Fallopian tube adherent to the sac and much enlarged, and near its centre was an old tear. It, with the ovary, was removed. On a loop of small intestine which had formed part of the sac-wall was a crater-like spot as large as a

silver dollar, evidently the site of the placenta. Cavity sponged out, a strip of gauze packed into it and the end brought out through abdominal wound, which with this exception was closed. Patient suffered from considerable shock, but rallied well. Gauze removed on fifth day, and a fecal discharge indicated the existence of a fistula, most probably from a slough at the site of the placenta. With this exception recovery was uninterrupted. Fistula rapidly contracted. Fecal material ceased to pass on November 25th. Patient out of bed December 2d. Discharged cured December 14th.

CASE XIV.—L. M., aged thirty-seven years; married; four children; one miscarriage. Last child two years ago. Menstruation had been regular and painless. No special complaint of pelvic pain until present illness. Last normal menstruation September 16, 1895. October 1st, complained for a few days of pain in left iliac fossa, not severe. Skipped menstruation which was due on October 14th. November 12th, after a slight fall felt severe cramp-like pains in left iliac region, and twenty-four hours later there was a sudden gush of blood from vagina. The pain continued for several days, and there was occasional vomiting. She suspected that she might be pregnant. November 13th, another attack of severe pain accompanied by a "flow," which latter continued more or less constantly until her admission to the hospital on December 13th. The pain continued for a few days, and afterward she was comparatively comfortable until December 7th, when she was again seized with severe pain and pregnant-vomiting. This continued until December 12th, when she was seen by Dr. Forbes Hawkes, who made the diagnosis of probable extrauterine fœtation which had ruptured, and he advised immediate operation. Temperature 101.5°; pulse 110. On admission, December 13th, temperature 100°; pulse 98. On examination a boggy mass was felt in Douglas's pouch about the size of a fœtal head. Just above and under the symphysis a solid mass the size of a hen's egg. Diagnosis—extrauterine fœtation which had ruptured into abdominal cavity.

Operation, December 13th. Ether. Trendelenburg position. Median laparotomy. On opening peritoneum considerable blood, both fluid and clots, found in its cavity. Omentum adherent to pelvic mass, easily separated. In median line under symphysis pubis and projecting toward the left side, a firm tumor the size and shape of a short, thick sausage. To its left, apparently on top of broad ligament, a thin sac the size of a hen's egg. Uterus pushed over to right side of pelvis. In Douglas's pouch, surrounded by adherent intestines, a soft mass the size of two fists. The sausage-shaped tumor above the symphysis found to be a distended Fallopian tube (left). It was removed, two clamps being placed on pedicle. During this extirpation the sac to the left ruptured and an ounce or more of bloody fluid escaped. This sac apparently consisted of a distended portion of the left broad ligament and was afterward removed. The mass in Douglas's pouch consisted of black blood-clots enclosed in a fragile sac, through the wall of which some leakage had apparently occurred. The clots were scooped out by the hands. The table was then lowered and the abdominal cavity irrigated with gallons of hot salt-solution until it ran out comparatively clear. A large amount of blood was thus washed out. The pelvis was again elevated, the pedicle and a few bleeding points in broad ligament and omentum ligatured with catgut, one clamp remaining. A strip of gauze was packed into Douglas's

pouch and brought out through the abdominal wound, the upper half of which was closed by suture. On opening the tube it was found to be distended with a firm mass of clotted blood. The distal end was open and led into a cavity about the size and shape of the last two joints of one's index-finger, the walls of which were composed of solid blood-clots. Considerable shock followed, and on the following day condition of patient was serious. Temperature 103° ; pulse 130. Frequent vomiting.

December 15th. Temperature $102\frac{1}{2}^{\circ}$; pulse 120.

December 16th. Temperature $101\frac{1}{2}^{\circ}$; pulse 110. Gauze removed.

Convalescence uneventful. Out of bed January 12th. Discharged cured January 27th.

CASE XV.—A. B., aged thirty-nine years; married; two children; no miscarriages. Menstruation had been regular and painless, and no complaint of pelvic pain until present illness. Last regular menstruation December 20, 1895. Menstruation in January probably skipped. February 21st, menstrual flow appeared. [‡] February 22d, while sitting on a privy-seat was suddenly seized with severe abdominal cramps and vomiting, accompanied by profuse vaginal hemorrhage. Abdomen became swollen and tender, and cramps continued. There was some evening temperature, and vomiting was frequent. The vomiting, pain, and distention increased until March 26th, when she was seen by Dr. J. C. Jay, who made a diagnosis of peritonitis. I saw her on the same day, and we decided that her condition would not justify an operation. Vomiting was constant; pulse 130; temperature 103° ; no movement of bowels for five days. Probable diagnosis—ruptured extrauterine fetation. Abdomen very sensitive, but by vaginal examination could be felt a boggy mass filling the pelvis and extending upward to near the umbilicus. Under Dr. Jay's care gradual improvement until April 25th, when he deemed a laparotomy justifiable. The mass extended well out of the pelvis and on the right side above the anterior superior spine of ilium. Pulse 110; temperature 100° to $100\frac{1}{2}^{\circ}$; stomach very irritable.

Operation. Chloroform. Median incision below umbilicus. Peritoneum incised superior to mass, which was shut off from general peritoneal cavity by adherent intestines, and was adherent to anterior abdominal wall. Peritoneum closed by suture, and incision extended downward. Bladder adherent to anterior surface of tumor, pushed downward. Under peritoneum blackish-green mass. Peritoneum opened and large quantity of dark blood, fluid and in clots, poured out. Hand scooped out clots and a three months' fetus, with cord and placenta, which was easily separated. Total amount more than two quarts. The cavity, the roof of which was formed of agglutinated intestines, was irrigated and drained with tube and gauze. During the first week there was much vomiting and development of urinary suprapubic fistula. Otherwise convalescence was uneventful. Discharged cured June 16th.

ON THE TREATMENT OF ANEURISM BY ELECTROLYSIS
THROUGH INTRODUCED WIRE: REPORT OF A
SUCCESSFUL CASE.

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In a paper by one of us (Stewart) recently¹ the unquestionable advantage of combining electrolysis with the introduction of wire, in the treatment of sacculated aneurism not susceptible of cure by medical treatment or by time-honored surgical means, was fully set forth. It was remarked as evident that the employment of galvano-puncture alone, however perfect the technique, had beyond doubt proved a failure in the therapy of aneurism. The introduction into the sac of filiform material, but especially of wire (Moore's operation), was shown to offer much to recommend it. The literature of the subject was then carefully surveyed in the paper, and individual cases in which wire had been used were analyzed. The conclusion seemed apparent that, given a proper subject, with proper technique, little risk attended the method and much promise of benefit. It was pointed out that failure in several of the cases reported lay in the direction of improper technique, such as the use of too great a quantity of wire,² and to the occurrence of septic complications, as in Moore's case.³ These, present knowledge would lead us to avoid. The fact that in most of the cases the operation was undertaken as a forlorn hope, with the aneurism on the point of rupture, had also to be borne in mind, for it was apparent in nearly all of the fatal cases that any other issue was scarcely to be expected. As concerns result, Loretta's case and Morse's⁴ plainly showed the great promise of the method when other conditions were also propitious for cure.

¹ The Treatment of Sacculated Aortic Aneurism by Electrolysis through Introduced Wire. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, October, 1892.

² In Moore's case 108 feet of wire were introduced, and in Cayley's, 75 feet.

³ Death here occurred from pyæmia.

⁴ In Loretta's case an abdominal aneurism, the size of a fetal head at term, contracted to the dimensions of a walnut, with obliteration of the sac-cavity, by the seventieth day after the introduction of two yards of silvered copper wire. Death resulted subsequently from rupture of the aorta below the sac. In Morse's case it is stated that eight weeks after the insertion of one and a half yards of one-half millimetre silver-plated copper wire into the sac of an abdominal aneurism the size of two fists, all indications of aneurism had disappeared, a hard nodule replacing the pulsating tumors. The patient remained well.

Electrolysis combined with the introduction of wire, by which a strong galvanic current is conducted through coils of the same filling the sac, was shown to be an incomparably superior method of promoting prompt coagulation to the use of wire alone. Apart from the harmlessness of the procedure, its advantages over the use of wire without electrolysis consisted in that "instead of a soft, unstable coagulum about the wire, tardy in appearing, there may be produced almost immediately a tough clot, which, in favorable cases, should tend by accretion to produce prompt obliteration of the sac-cavity." Over mere galvano-puncture the superiority lay, as was remarked, in that in the former, if the wire were properly disposed, a firm coagulum, perhaps completely filling the sac, might be expected to occur promptly, instead of a few small nodules at the periphery which would have little effect upon a large mass of circulating blood.

The seven cases then on record were analyzed and a new one reported. It was shown that these scarcely bore collective review. Burresi-Corradi's case—a thin-walled, rapidly growing aneurism—had been regarded as utterly hopeless for any treatment prior to operation, as were those of Barwell, Roosevelt, Abbe, and my own. In another of the seven the sac was fusiform in character, and not, as remarked, suitable for the application of the method. In several the technique employed was most faulty. Far too much wire was used in two than could have been productive of ultimate good.¹ The current-strength and the polarity employed in several were not mentioned. In these it seemed likely that the former was insufficient and the second scarcely the best. In Abbe's case, which had been regarded as utterly hopeless prior to operation, it was still unfortunate that a beneficial current of 50 milliampères anode for a half hour should have been succeeded by one calculated to soften rapidly and 'separate the clot so induced—100 milliampères cathode the second half hour. On individual study of these cases it appeared obviously unfair to hold that the operation was of slight promise because of the seven cases but two were cured. From the evidence these two were the only ones susceptible of cure.

In the senior writer's case the aneurism was of enormous size, showing advanced pressure-symptoms. A large part of the sac-boundary consisted no longer of arterial tunics, but of eroded ribs and vertebrae, and in the situation of the bodies of several of the last which had been largely absorbed lay spinal cord protected only by its membranes and by clot. In this case the operation had been attempted rather as a means of euthanasia than with idea of cure. Intense suffering from nerve- and bone-pressure rendering constant use of anodynes necessary

¹ In Roosevelt's, 225 feet of wire were introduced; in Abbe's, 150 feet, nine days after the insertion of 100 feet of catgut.

was hoped to be obviated for a time through the formation of supporting coagula. This case proved fatal on the ninth day succeeding operation, an indiscretion on the part of the patient causing rupture of the sac in a section of the aneurism some distance from the wire or the clots that engaged it. The enormous size of the sac had precluded the possibility of complete solidification by clot. In this case, as with all of the others in which the conditions were at least moderately favorable for clot-formation, decided evidences of this were evident soon after operation. A necropsy, when obtained, strikingly demonstrated the value of the method.

It has since been Dr. Stewart's good fortune, through the kindness of his collaborator, to repeat this procedure. In the present case, here reported, there was a large and rapidly increasing innominate aneurism. Its anterior surface was unprotected by clot, and indications of early rupture were very evident. The patient's condition was most unfavorable otherwise. He was an inmate of Blockley; had been for years of dissipated habits and had had syphilis. There were evidences of advanced nephritis, of greatly enlarged heart and of badly damaged aortic leaflets. Blood-pressure was persistently high and utterly uninfluenced by large doses of potassium iodide.

Although an absolute cure¹ was here scarcely to be expected for these reasons, the result obtained well illustrates the usefulness of the method in promoting clot-formation, its innocuousness, and the benefit which may accrue in a case the duration of the life of which was then regarded as ephemeral. The patient after a few weeks in bed has since steadily been about. The aneurism, although still somewhat prominent and pulsating, can be handled with impunity. It causes no obvious pressure-symptoms.

HISTORY OF THE CASE, BY DR. SALINGER.

G. D., aged forty years; white male. Syphilis in 1881. Very severe attack of acute articular rheumatism in 1887. A heavy drinker since early manhood. For a number of years worked in lead, but no history is obtainable of plumbic poisoning. Has been a stonemason lately. This occupation necessitates great physical strain. Had a bad fall (from the second story of a house) in December, 1891. Was injured about the body and extremities. States that he also bruised the right side of the chest in the situation at which the aneurism developed a year later. In December, 1892, severe pain was first felt in the neck on both sides, but especially on the right. Paroxysmal cough, and slight, although continuous dyspnoea, also appeared. In April, 1893, he first noticed a swelling below and to the right of the right sterno-clavicular junction. This steadily increased in size. Admitted to the writer's wards, Philadelphia Hospital, June 23, 1893. The following was then also noted: Patient had dissipated appearance, suggesting a heavy drinker. Face

¹ A cure as concerns complete obliteration of sac.

swollen, cheeks flushed, conjunctivæ injected. Dilated venules on face and upper extremities. Right pupil smaller than the left. Chest fairly well developed. Aneurismal swelling extends from the middle of right clavicle to left sterno-clavicular junction and from upper border of the second rib to two inches above clavicle. The prominence is four inches in vertical direction, four inches in transverse, and three-quarters of an inch above the level of the sternum. Dulness appears at the centre of the right clavicle. Transverse measurement of dulness seven and three-quarters inches. Tumor in shape that of segment of circle, curve downward, with radius three and a half inches. Expansile pulsation over all parts of tumor. Thrill and bruit present and transmitted into carotids.

Heart: Apex-beat diffused; pulsation visible over large area; to palpation most apparent in sixth interspace, a half inch outside mamillary line. Marked double aortic murmur, the diastolic part of which is transmitted to apex. Typical water-hammer pulse absent. Little difference noted in the two pulses by finger or sphygmograph. Aneurismal character absent. Both pulses at times anacrotic, the left rather than the right shows tendency to complete obliteration of diastolic wave, so common in aortic regurgitation. Both have usually great altitude of percussion-wave. Laryngeal examination negative. Patient has considerable cough, both dry and attended with expectoration. Sputum examination for tubercle bacilli and elastic tissue negative. Upper part right chest shows poor expansion, vesiculo-bronchial breathing, slightly impaired resonance. Blood-spitting occurs. Urine contains much albumin.

Patient placed on potassium iodide in ascending doses. Tuffnell's treatment was also adopted. Despite this aneurism rapidly increased in size. Rupture externally seemed imminent. Outlook apparently hopeless. Interference by deligation on the part of the surgeon on duty refused. Dr. Stewart invited to see the case with a view to treatment by his method of electrolysis through introduced wire.

HISTORY OF THE OPERATIVE PROCEDURE, BY DR. STEWART.

I concluded in this case to adopt practically the same technique as in the other case detailed in my first paper. In this instance, however, in which apparently better ultimate results might be expected, I choose for insertion, by preference, a finer wire. In my first case, as I have elsewhere remarked, "I concluded a better chance of immediate success lay in the introduction of wire of sufficient calibre to form large, supporting spirals in the sac, thus occupying considerable of its cavity, and affording a framework for clot, than in the use of a thinner, more pliant wire, which, though better calculated to permit of ultimate contraction of organized fibrin and sac-walls—apparently not to be hoped for here—might undergo deflection from its course in introduction through impingement on loose coagula already in the sac, thus perhaps rendering it necessary to repeat the process, which from the patient's enfeebled condition would have been impracticable." In the present case, with a much smaller sac, and one less likely to contain interfering clot, the interior of which, on all sides, could be reached by a few feet of properly drawn spirals, the ideal wire was one of as small a calibre as would, while maintaining its spiral shape, subsequently admit of coincident contraction with the large enveloping coagulum to be formed under the current's influence.

I had at first intended employing silver wire; but as difficulty then existed in obtaining it sufficiently firm of a suitable fineness, after consulting with Mr. Otto Flemming, I concluded to resort to gold wire, which latter seemed to meet better the indications. The chief objection to the use of gold wire, we agreed, lay in the fact that a greater strength of current was necessary to promote roughening of its surface, to induce the prompt coagulation about it desired. Iron wire was impracticable and even dangerous for use for the reasons fully cited in my paper, based on very convincing experiment. The wire was drawn hard to No. 30 gauge and so wound that when finally passed through the needle it formed separate spirals of moderate dimensions.

The procedure was carried out on July 27, 1893. Strict antisepsis was, of course, adopted. As in the other case, I determined upon the conjoint use of galvano-puncture, by means of several needles connected with the same rheophore as the wire, hoping thus better to secure an extensive coagulum from wire to needles and to sac-wall.¹ Two platinum needles of good calibre were first introduced toward the periphery of the sac. These were well insulated at their base to protect the skin. More than an inch penetrating into the aneurism was left uninsulated. About this from the wire to the sac-wall it was desired to promote clotting under the current's influence. One of the two needles after introduction could be freely moved about in the sac. Upheld after insertion it fell from the perpendicular to a horizontal position, showing how thin was the sac-wall in this position and that no supporting clot lay beneath it. The other, introduced at another point at the periphery several inches from the first, seemed less free, so that after a time it was withdrawn, blood flowing freely from the site of puncture. The receiving canulated needle was of as small a calibre as would admit the passage of the wire, and was insulated to its tip. This I introduced into the most prominent and central portion of the sac, at a point so thin-walled that blood spurted through the needle when penetrated to a depth of but a fifth of an inch. Blood continued to flow between canula and wire until the current was closed. Ten feet of wire were now slowly passed into the sac and the points of contact connected by the anode. A large clay plate forming the indifferent electrode, was placed upon the abdomen. Its position was changed from time to time without breaking the circuit. The current was, of course, controlled by a rheostat. The electrical outfit contributed by Mr. Flemming was in his care. The current was passed without interruption for seventy-five minutes. It was gradually increased to 30 milliampères in one minute to 65 milliampères in five minutes; to 75 milliampères in ten minutes and 80 milliampères in fifteen minutes, and maintained steadily at the latter point for one and a quarter hours. Both of the needles, which from their weight (the weight of the wire in the canulated one) tended to lay horizontal to the sac-wall unless upheld as they were, at the expiration of half an hour remained perpendicular without assistance, showing well the wonderful clot-forming power of this strength of current through the anode. Toward the end of the procedure it was generally remarked by all present that pulsation had quite markedly lessened over a large part of the sac. The patient was carefully watched by Dr. Salinger and myself during

¹ See my paper in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, October, 1892, p. 432.

the operation. The procedure was well borne. No pain was felt at any time during it or subsequently, and there was no evidence of shock.

SUBSEQUENT HISTORY AND REMARKS. AN ACCOUNT OF A SECOND ATTEMPT AT INTRODUCTION OF WIRE WHICH DEMONSTRATED CLOT-FORMATION.

Slight oozing recurred from the site of one of the punctures for a few days subsequent to operation. It was controlled by iodoform collodion and the application of ice. Pulsation in the sac steadily diminished, and showed little of an expansive character by the end of the second day. Thrill, too, was then noted to have largely disappeared. The patient complained only of stiffness in the neck, caused by lying so long in one position. He swallowed fairly well. Respirations at first were stridulous, but later became normal. No elevation of temperature occurred. All who had followed the case noticed the decided lessening in pulsation in the sac, especially its lower half, through which the wire had been passed, and which previously had shown the most expansile movement. Potassium iodide was repeated after a time. It was thus hoped to assist in clot-formation through influence on blood-pressure. Later, for short periods, we also used calcium chloride in small doses, after Wright's method, measuring its effects upon blood-coagulability by the latter's apparatus. Little benefit was obtained from it; we found that even in small doses its effect early was to delay the onset of coagulation after ephemerally having had the opposite effect.

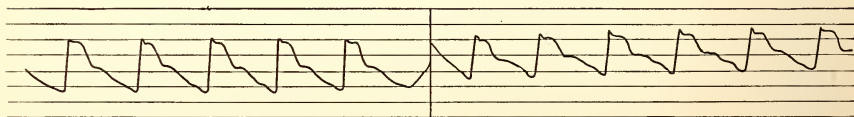
At the expiration of three weeks, although we agreed that the lower half of the aneurism had unquestionably diminished in size, become firm and no longer showed expansile pulsation, so marked a change in the upper portion was not apparent. It was evident that clot-formation had been induced, although its extent seemed limited. The patient's bad physical condition, from the arterial wall-changes evident, the damaged heart, and very incompetent kidneys, did not render the outlook promising. Blood-pressure was constantly abnormally high, and rupture in the upper segment of the sac seemed still to be feared for a reason mentioned by Dr. Stewart in his first paper¹ as the probable immediate cause of death in a certain number of cases in which filiform material was introduced, irrespective of any direct danger from injury by the material itself. The risk seemed to be "in consequence of the partial obliteration of the sac-cavity by former coagula resulting in rapidly raised pressure in an unprotected and weakened portion of the sac now exposed to a greater pressure than formerly." We regarded it as likely that the wire had only filled the lower segment, which was probably larger than we had supposed. Dr. Stewart thought it well to attempt to repeat the operation, if possible introducing more wire into the upper segment of the sac. This was the portion in which the platinum needle had been

¹ Page 436.

placed, which at first was totally unprotected, but which at the end of the electrical session showed decided evidences of coagulation.

Accordingly, four weeks after the first operation he inserted perpendicularly a canulated needle, an inch and a quarter in length, to its full extent, into this part of the sac, which now seemed the weakest and thinnest portion. No blood flowed at any depth, although the needle was inserted slowly. But one to two inches of wire could be forced into it, with most patient effort. The wire and finally the needle were withdrawn. Not the slightest oozing followed, nor was either needle or wire blood-tinged. An attempt was now made to pass the needle at another point which seemed from external evidences less protected. The result was similarly negative. No blood flowed, no wire could be passed, and the needle could be moved about only with difficulty in the previously fancied cavity. On the following day a needle of larger calibre, two inches in length, was tried by Dr. Stewart with similar result. This he thrust into the sac in two situations in a direction perpendicular to the surface as before. The new sites of puncture chosen were those in which the sac also seemed weak. Another attempt was also made by entering the needle near the upper base in a direction obliquely downward. In each instance the result was similar. No blood flowed at any depth penetrated (upward of two inches), and at no depth could more than two inches of wire be with difficulty thrust through the needle. This was a beautiful demonstration that consolidation had been effected in all parts of the sac, which other evidence had previously rendered doubtful. No oozing occurred after these multiple and deep punctures, and no ill result. The patient was soon after discharged from the hospital. He has been under observation to the present. Indications of chronic nephritis continue as before. The urine is constantly diminished in amount (averaging, in recent estimations, 800 c.c. in twenty-four hours); albumin is steadily present ($2\frac{1}{4}$ grammes to the liter); there is low urea ($12\frac{1}{2}$ grammes in twenty-four hours), and an abundance of granular, epithelial, and hyaline casts. Symptoms of renal inadequacy are common, although not decided. His habits are, as before, irregular. He is about the streets, and still drinks freely of spirits when opportunity offers.

Despite these most unfavorable conditions the aneurismal tumor, although still prominent, has caused him no inconvenience for a long time. Pulsation is still evident, but is apparently a communicated one. No thrill is present in the aneurism, although one still persists in the carotids. Although clot-formation has unquestionably occurred, such complete subsequent organization of the mass necessary for final obliteration of the sac-cavity has probably been impossible because of the very bad physical condition and habits of the patient. The sac is, however, so well protected by clot that no direct or remote symptoms occur from the aneurism itself.



G. D., April 25, 1894; right radial, pr. 3 oz.; left radial, pr. 3 oz.; sitting.

Decided improvement has also occurred in the cardiac condition since the operation, presumably scarcely to be accounted for as a direct result of the change in the aneurism. The area of cardiac dulness is considerably less; the double aortic murmur is much diminished in intensity—the systolic bruit is now scarcely appreciable, and the diastolic not marked. The radial pulses are equal. The sphygmograms exhibit markedly the evidences of sustained high blood-pressure constantly present, the result of inadequate kidneys. The accompanying tracings well illustrate this.

Aneurismal character and evidences of the aortic valve lesion are now absent from the pulse.

June 23, 1896. Almost three years have now elapsed since the date of the operation (July 27, 1893). The patient, followed to the present, is in his usual health. Two quite small, soft areas are now apparent in the otherwise firm aneurismal sac, not present a few months previously. That he has lived so long, despite the ill-result of the extensive cardiac and renal disease, and his vagrant habits, on his general condition, with an aneurism of such dimensions is surprising. Such a result in what was so hopeless a case is most gratifying and suggestive.

COMPOUND DEPRESSED FRACTURE OF THE SKULL; ABSENCE OF UNCONSCIOUSNESS; PARALYSIS OF ONE-HALF THE BODY; OPERATION; RECOVERY.

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THIS case illustrates that consciousness may be unimpaired following an injury to the head severe enough to cause paralysis.

A boy, nine years old, was struck in the head by a brick falling from a height. He was seen immediately after the injury at the hospital and found to be conscious. He answered questions naturally. There was a large scalp-wound over the parietal bone and a little anterior to the parietal eminence to the right of the median line. The bone beneath the scalp-wound was fractured and depressed into the brain-substance. The left arm and the left leg were completely paralyzed to motion. The right pupil was dilated; sensation was present. The right upper eyelid drooped. There was a scar in the right cornea. Immediately after the injury the temperature was 96° F., the pulse was 74, the respiration was 26. When examined one hour after the accident the pulse had fallen to 68, he had vomited once, and had been somewhat nauseated.

The operation of elevation of the depressed fragments of bone was done under ether. The fragments of bone removed were about the size of a silver half-dollar. There was no fissure in the skull. The dura

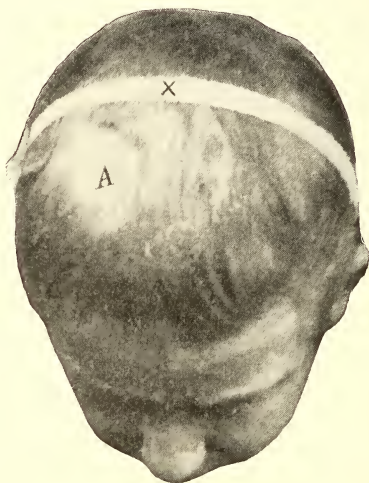
mater was torn and the brain slightly lacerated. Upon elevating and removing the depressed bone hemorrhage occurred from the vessels of the dura mater. The depressed bone was not replaced. The dura was left open and the cavity was drained by a wick of gauze, which was removed upon the third day.

A few hours after the operation the boy was perfectly conscious as before the etherization, the pupils were normal, and motion had returned in the paralyzed limbs.

Three weeks after the operation a small, granulating wound remained and there was a slight tendency to hernia cerebri.

Four months following the accident the boy's condition is as follows: The wound is nearly healed and continues to discharge at times. He walks naturally. There is no paralysis of arm or of leg. No mental symptom is present.

The interesting and unusual fact in this case is that after a blow sufficiently severe to cause a depressed fracture of the skull and paralysis of one-half of the body the patient remained conscious.



Compound depressed fracture of the skull.

X. The mid-point between glabella and inion. A. Middle of depressed bone.

The exact location of the injury to the head and brain is shown in the accompanying photograph.

NOTE.—For a study of the interval of consciousness after head-injuries, see *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, April, 1895.

DIAGNOSIS OF CHRONIC ABSCESS OF THE BRAIN.

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CHRONIC abscess of the brain may, for the sake of convenience of description, be divided into two varieties. The one is the result of acute or subacute focal intracranial suppuration in which the symptoms have become more or less latent; while the other begins with symptoms so ill-defined and unobtrusive as scarcely to attract attention, if, indeed, they do not escape observation entirely during the early stage of the morbid process. It would aid in preventing confusion in the study of abscess of the brain if all those cases that begin with more or less pronounced cerebral symptoms, and continue with unmistakable and progressive signs of brain-disorder, were regarded as acute or subacute, no matter what may be the duration of their course. It may be argued that it would be more definite to call those abscesses of the brain that begin with acute or subacute symptoms, and are followed by a latent period, as latent, leaving the term chronic to apply only to those whose early period is insidious. It does not matter much which course is followed so that it is distinctly understood what is meant to be conveyed by the word chronic as employed to designate certain varieties of abscess of the brain. A chronic abscess is essentially latent from its commencement to the beginning of its terminal period, and the so-called latent abscess is usually one whose duration is more or less prolonged. An abscess of the brain whose early symptoms have been so unobtrusive as to place it in the category of the chronic variety may run a much shorter course than the one ushered in by pronounced symptoms and followed by a latent period.

Wide differences of opinion are held to-day by physicians and surgeons of recognized ability regarding the difficulties encountered in the diagnosis of chronic abscess of the brain. Much of this discrepancy is due, it seems to me, to many accepting all intracranial suppuration as the result of an acute process. At the Surgical Congress held in Berlin April 17, 1895, the distinguished surgeon, Professor von Bergmann, in a paper entitled "Progressive Cerebral Surgery," stated: "Cerebral abscess must always be operated on. Its diagnosis is easy if the etiology is considered. The principal cause of cerebral abscess is inflammation of the middle ear; it is usually situated in the temporal lobe." Leube, than whom few have attained to greater distinction as careful and painstaking diagnosticians, says: "The diagnosis of subacute and chronic

abscess of the brain is, on the whole, easy." According to Professor Murri: "He (Leube) gives the most important indications of cerebral abscess, intermittent fever associated with rigors, and attributes great value to the absence of optic neuritis and etiological considerations." (*Lancet*, January 12, 1895).

Gowers, in his work on *Diseases of the Nervous System*, begins the paragraph on diagnosis of cerebral abscess with "The extreme variability and frequent latency of the course of cerebral abscess often render its diagnosis difficult and even impossible."

Spitzka, in Pepper's *System of Medicine*, after making the statement that "there is little difficulty in recognizing the existence of cerebral abscess in which well-marked focal and constitutional symptoms coincide, or where a distinct abscess-producing cause, such as an ear-trouble, a head-injury, or a putrid bronchiectasis, coexists, adds, "but there are a number of cases, varying from the latent form to forms with obscure general symptoms, whose recognition is impossible or at best a matter of conjecture." (Vol. v. p. 799.)

Professor Murri states that Martius has made a study of seventeen cases of cerebral abscess occurring in the German hospitals during the past few years, and not one of them was recognized during life (*Lancet*, January 5, 1895, p. 12). I might continue at great length to quote from various writers concerning the difficulties of recognizing, during life, chronic cerebral abscess, and I might add mistake after mistake in diagnosis, not a few of which would be my own, but I have no need to extend my remarks in this direction, as you are aware, I have no doubt, from personal experience, of the uncertainties attendant upon the diagnosis of intracranial suppuration, especially of the chronic variety. I do not wish to underestimate the difficulties that are sometimes encountered in diagnosing acute cerebral suppuration. These not infrequently prove insurmountable, but they are, on the whole, less than are met with in diagnosis of chronic abscess. Many of our text-books are content with a description of abscess of the brain, as though it always originated in acute cerebral suppuration.

The importance of recognizing the essential difference between acute abscess and chronic abscess of the brain will justify a rather lengthy quotation from Professor Murri's admirable "Address on Experimental Craniotomy and Diagnosis of Cerebral Abscess" (*Lancet*, January 12, 1895, p. 79) :

"Abscess of the brain, which, when clinically considered, seems to be an essentially unique morbid process, resolves itself into two varieties which differ utterly in diagnosis, viz.: acute abscess and chronic abscess. Writers aiming at the unity of the process lose sight of the clinical side, and do not bring into sufficient relief the practical differences which exist between the two varieties. What they say of abscess applies chiefly to the acute form. Bacterial analysis might throw more light on the causes of the differences

which are developed in the process of suppurative inflammation of the brain. At present what we chiefly know is the intensity of the exciting causes; the duration of the process depends much on these. If a considerable cerebral artery is closed by an embolus; if a wound on the head causes disturbance, contusion, or hemorrhage in a zone of the brain; if a suppurative otitis media violently affects the bony substance and gives rise to a thrombus in the cranial sinuses, or excites inflammation in the adjacent meninges, the nutritive process of the cerebral tissues near cannot avoid deterioration, the pyogenic agents find a field well prepared, and their devastations are in consequence very rapid. But here, besides the rapidity of the disease, there arises another clinical distinction. These occurrences, being more intense, cannot easily happen without being perceived by both the patient and his medical attendant. Moreover, the succession of phenomena aroused by them is not so disconnected as to lose the evidence of their reciprocal relation and the unity of the process they reveal. Finally, even the reaction of the brain provoked by rapid and great intracranial changes is more evident and appreciable to the practitioner. If to all this we add that the rapid diffusion of suppuration causes fever, and even a special fever, as a phenomenon revealing the nature of the morbid process, then it is easy to comprehend how the clinical idea assumes a form so distinct that the diagnosis of acute abscess naturally follows.

"When we come to the chronic forms of cerebral abscess, the description and opinions of pathologists inspired by the observation of such facts no longer correspond to the facts themselves. In these the exciting causes are less intense or less apparent. It is one thing, for example, if an embolus from a pulmonary vein closes the artery of Sylvius, and another if pus penetrate unperceived into the brain by one of those narrow ways which lead there from without. The slightness of the latter is not only marked by the absence of disorders perceptible to the patient, but it also causes a slower succession of changes around itself; the surrounding tissues, not previously affected and violently attacked, have time to organize themselves for the defence, and in time circumscribe with a solid barrier (pseudo-membrane) the hostile element (pus) which tends to destroy it. This mysterious faculty which the brain possesses of adapting itself to the most serious lesions as long as they are gradual has full opportunity to act completely. Thus it follows that, from ignoring or forgetting the primary cause, it seems as though no external cause exists; and here we have the idiopathic abscess, which is almost always chronic. Even where the primary cause is known, if it be not violent, the process which succeeds follows with less rapidity, and hence the slight changes of the brain may not arouse perceptible functional disorders. Here we have the latent abscess or the latent period of the chronic abscess. The slowness with which brain-alterations proceed proves that a length of time is required for their development, and here we see the abscess become chronic. The perception of these internal processes is often defective, as is frequently seen in the doctrinal works of the pathologists and in the reasoning of clinical physicians who write and think of cerebral abscess as though it existed only in the acute form. But the abscess exists also in the chronic, idiopathic, latent, or semi-latent form, and this, though less frequent than the acute, is by no means as rare as statistics would make us believe."

A small number of cases of chronic cerebral abscess, from their inception to the beginning of the terminal period, and a few others in their most latent stage, may not present pronounced symptoms of organic brain disease until there are manifestations of the terminal period, but a careful study of cases of obscure brain diseases will reduce this number to a minimum. The symptoms of abscess of the brain are common to several forms of organic brain disease, and a correct interpretation of

them will depend upon the experience, diagnostic skill, and thoroughness of the medical attendant. Professor Murri's precaution to bear in mind the possibility of the presence of chronic cerebral abscess in investigating cases of obscure brain disease might be advantageously observed by all. The frequency of this form of cerebral abscess is not great, but the presence of chronic cerebral suppuration is too often overlooked for the credit of medical science or the welfare of the unfortunate sufferer.

Conclusions reached by an analysis of the most accurate history may, in some cases, lead from the truth; but in the vast majority of instances information thus obtained, together with a thorough examination of the mental and physical condition of the patient, when all the modifying circumstances of the case are carefully considered, will greatly aid in arriving at an accurate diagnosis. Not infrequently the history of some condition that is known to be favorable to abscess-formation in the brain will be obtained from the patient. Months, and in rare cases years, may have elapsed since the cause was apparently active, and at the time of the examination it may have been forgotten both by the patient and his friends, and memory of it is only revived by a careful and intelligent line of questioning. It may have been a blow on the head; a fall from a height and lighting on the feet or buttocks without striking the head; a painful condition of one or both ears, either with or without otorrhœa; suppuration in some portion of the body; or some exhausting disease, possibly influenza, diphtheria, rheumatism, or typhoid fever, from which recovery has never seemed complete. In typical cases the history will develop the fact that headache, intermittent or constant, has been a prominent feature for a greater or less part of the time that has occurred since the time of the illness that left the patient's health impaired. In some cases irregular febrile phenomena, dimness of vision, vertigo, failing nutrition and strength, and sometimes mono-spasm, mono-paresis, hemiplegia, or general convulsions have been experienced. In the majority of instances, on examination of persons suffering from chronic cerebral abscess, we shall find evidence of organic brain disease; but occasionally the patient may present a vigorous appearance, and death may occur without warning, as was the case in Professor Murri's experience (*Lancet*, January 12, 1895, p. 80). The most careful and exhaustive examination of the motor apparatus and of the general sensory phenomena may yield negative results. The reflexes may be normal or slightly exaggerated. If the motor cortical areas or the motor tracts of the brain are affected, either directly or indirectly by the abscess, symptoms of paresis, paralysis, or muscular rigidity will be present, corresponding to the extent and situation of the abscess and the softening resulting from its presence. Nutrition and muscular strength usually fail in the course of the disease, but in some cases these are

unimpaired. Mental failure, especially slow action of the mental faculties, and difficulty in maintaining mental concentration for a length of time, and lessened power of memory, together with irritability of temper, are not infrequent results of chronic cerebral abscess. Recurring convulsions, sometimes mistaken for those of idiopathic epilepsy, are occasionally found in cases whose other symptoms of cerebral disease are most obscure.

INDIVIDUAL SYMPTOMS. Among the special symptoms of chronic abscess of the brain headache is the most important. Its significance is that its beginning dates from exposure to certain conditions that are known to be capable of giving rise to abscess of the brain. It is rarely constant, but there are very few cases of this disease in which headache has not been more or less pronounced during some portion of their course. At times the headache is severe, and at others it amounts simply to a dull or uncomfortable cephalic sensation. In some instances the headache, if present at all, has been so slight as to escape attention entirely. When the terminal period, caused by softening, cedema, or extension of the abscess, is reached, headache, even if absent before, often becomes a very prominent symptom, and its severity marks the beginning of the end. The seat of the pain does not always correspond to that of the abscess. If the terminal period is short and the symptoms tumultuous, the obscured consciousness often prevents any voluntary complaint of head-pain being made, although, even in such rapid cases, if the patient can be aroused and his attention engaged for a few moments, the fact that headache exists can, not infrequently, be obtained from the patient in answer to a direct question. The typical temperature of chronic abscess of the brain, if the morbid process is sufficiently large to exert much depression, is normal or slightly subnormal. At times there may be slight intermittent febrile processes which are frequently attended by cool and clammy perspiration. Optic neuritis, when present, is a symptom of great importance. Some observers seem inclined to think that it is of infrequent occurrence, while others have observed it in a sufficiently large proportion of cases to regard it as a valuable aid in the diagnosis. In the cases that I have observed it has been present more frequently than absent, but the extreme degree of swelling so commonly seen in association with tumor of the brain I have not observed as a symptom of abscess.

Terminal period. This period may extend over several weeks or a few days, and, possibly in some cases, may last only a few hours. Its duration depends upon the manner in which the abscess causes death. The latent period may end suddenly by the abscess bursting into the lateral ventricles and giving rise to all the symptoms of intra-ventricular hemorrhage. The rupture may occur on the surface of the brain and cause local, or, more commonly, general lepto-meningitis, which

proves rapidly fatal. When the pus finds its way to the surface of the brain in the posterior fossa, both by the meningitis and the direct irritation of the pons and medulla, the cardiac and respiratory centres are interfered with. In the latter case, if the patient survives the shock, the symptoms will be those of cerebro-spinal meningitis, prominent among which will be retraction of the head, rigidity of the muscles of the back of the neck, and sometimes of the spine, with manifest opisthotonus and shock-like convulsive rigidity of the muscles of the limbs, especially of the arms. Œdema and softening of the brain-substance are the causes of death in about one-half the cases of abscess of the brain. In many of these in which the motor and sensory areas of the brain are not especially affected, either directly or indirectly, by the abscess, the softening may take place so gradually that no symptoms of it may be detected until sudden collapse or death results from the apparent arrest of cerebral function. It is probable, however, that if these cases that end suddenly from softening and œdema were carefully watched, symptoms of failing brain-power and general vigor, together with increased headache, irritability of temper, and a tendency to depression, might be detected weeks before the fatal end. In all the cases of chronic abscess of the brain except one which have come under my observation during the terminal period the symptoms of this stage have developed in a subacute manner. The prominent symptoms have been headache, usually dull and heavy in character, but at times attended with severe paroxysms of pain, failure of nutrition, energy, and strength; mental dullness and slowness, and irritability of temper; vomiting only when associated with severe paroxysms of pain in the head; optic neuritis in a number of instances; slow or normal pulse when the patient is quiet, but sometimes easily accelerated by exercise; subnormal temperature in nearly every case; convulsions occasionally at the beginning or ending of the terminal period; paralysis, usually hemiplegic in character, or paresis, with rigidity of the affected muscles from pressure on the motor fibres of the brain, in more than one-half the cases, and in a number hemianæsthesia with hemianopsia. As the terminal period progresses the symptoms increase in gravity; the sensory functions become more and more blunted, the patient's apathetic condition increases, and finally stupor, followed by coma, sets in, and the patient dies after remaining unconscious several hours to several days. It is rare after symptoms of the terminal stage become prominent for the patient to show more than temporary improvement.

LOCALIZING SYMPTOMS. Percussion has afforded me little or no aid in diagnosing a chronic abscess. The localizing symptoms of abscess of the brain may vary from those of tumor because pressure-symptoms are sometimes less marked in the former than in the latter, and on account of the more complete destruction of tissue and greater œdema

and softening found associated with abscess. We must remember, however, that a tumor may exert no more pressure than abscess, and that it may as effectively destroy brain-substance as the latter. Definite focal symptoms are less frequent from abscess than from a morbid growth, because the most common seats of the former are in those portions of the brain, the cerebellum, frontal and temporo-sphenoidal lobes, whose functions are not definitely known. It is probable that distinct localizing symptoms are as frequently absent as present from abscess of the brain.

Frontal lobe. A large abscess may exist unsuspected in the anterior portion of the frontal lobe, and a small one may be situated just anterior to the motor region without giving rise to symptoms indicative of its location. It is only when softening or oedema extends backward to the motor area of the cortex or the white substance beneath it, or pressure is exerted on this portion of the brain, that localizing symptoms develop, except in a few cases in which pupillary symptoms are found when the abscess is in the posterior and lower portion of the frontal lobe. If, with general symptoms of abscess of the brain following a blow on the front of the head, a septic embolus from the lungs or associated with an infective process in the frontal sinus, a gradual increasing paresis or paralysis of the face or arm on one side should occur, preceded, or not, by convulsive movements of the affected muscles, pupillary symptoms would indicate one frontal lobe as the seat of the abscess. If the pupil on the side opposite to the one on which the muscles are involved should become sluggish or inactive, while its fellow responded normally to light and accommodation, it would aid in locating the abscess in the posterior portion of the frontal lobe. It must be borne in mind, however, that the same pupillary phenomena may be present when the anterior portion of the temporo-sphenoidal lobe is the seat of the abscess, as occurs from a similar lesion in the posterior portion of the frontal, but suppuration in the former situation usually results from middle-ear disease. Macewen's observations in relation to the pupillary phenomena may be quoted in full: "When the abscess is situated in the temporo-sphenoidal lobe or the frontal lobe, the pupil on the same side as the abscess may either become myotic or mydriatic, accompanied by a degree of stability. When the abscess is small and produces cerebral irritation the pupil on the affected side may be more or less contracted and sluggish. When the abscess is large and exercises considerable pressure the pupil on the affected side is prone to stabile mydriasis. An abscess which is small and produces a stabile myosis to begin with, may, as it augments in bulk, produce a stabile mydriasis in the same eye. Occasionally, the only difference detectable is sluggishness of one pupil to both light and accommodation, while its neighbor acts freely. In a case of cerebral abscess a sluggish pupil with either mydriasis or

myosis on the same side as an infective injury to the skull, or a unilateral otitis media, affords further evidence of the abscess being on the corresponding side of the brain." (*Pyogenic Infective Diseases of the Brain and Spinal Cord*, p. 145.) In five cases of abscess of the frontal lobe observed by me the pupillary phenomena described by Macewen were present in only one, but this was the only one of the five in which the abscess was located in the posterior portion of this lobe.

Temporo-sphenoidal lobe. A small abscess, and even one of considerable size, may be situated in the temporo-sphenoidal lobe without giving rise to any distinct localizing symptoms. In the case of chronic abscess of this lobe the history, most likely otitis media on the same side as the abscess, might afford the only clue to localization. A large abscess, on the other hand, would probably develop localizing symptoms from the effects of pressure on the surrounding structures, and if extensive softening and œdema should occur, regions of the brain whose functions are fairly well known would become involved. If the abscess were on the left side in the posterior portion of the temporal region, so as to affect the first and second temporo-sphenoidal convolutions, sensory aphasia would be present. On either side of the brain a large abscess in the anterior portion of this lobe might cause paresis or paralysis, first in the face, and secondly in the arm of the opposite side, with pupillary symptoms, such as sometimes occur in abscess situated in the posterior portion of the frontal lobe. Macewen has observed in cases of abscess in the anterior portion of the temporo-sphenoidal lobe paralysis of the third cranial nerve of the same side, thus producing crossed paralysis, the third cranial nerve on the same side as the abscess being affected and paralysis of the face and arm of the opposite side resulting. A careful study of the direction in which the paralysis extends after the first group of muscles is involved will often afford valuable information upon which to base a localizing diagnosis. Not infrequently the middle-ear disease which leads to acute abscess of the brain paralyzes the facial nerve as it passes through the Fallopiian canal, but this rarely occurs in chronic abscess.

Occipital lobe. In three cases¹ of chronic abscess of the occipital lobe observed by me paresis and muscular rigidity, nearly complete hemianæsthesia, and hemianopsia of the opposite side existed. In each case the abscess was large and situated in the white substance, so as to exert pressure on the fibres of the posterior half of the internal capsule. It is probable that the fibres coming from the cortical centre of sight in the cuneus were rendered functionless, either by pressure or softening, as the cortical substance of this region did not seem to be directly involved. A small encapsulated abscess, in all probability, might remain in the

¹ The Medical News, July 27, 1895.

white substance of the occipital lobe for a long time without giving rise to any localizing symptoms. It should be borne in mind that chronic abscesses of the so called idiopathic variety (probably due to suppuration in distant portions of the body) is most commonly situated in the occipital lobe.

Cerebellum. An encapsulated abscess of considerable size situated in the posterior portion of one lateral lobe of the cerebellum might cause no definite symptoms so long as it remained more or less latent. An abscess in the anterior portion of either lateral lobe or one in the middle lobe would likely give rise to pressure-symptoms on the pons and medulla, in which case cerebellar ataxia would be manifest. The cardiac and respiratory phenomena, together with yawning, observed in acute abscess of the cerebellum, would probably not occur in the chronic abscess until the terminal stage develops.

DIFFERENTIAL DIAGNOSIS. Other organic lesions than abscess of the brain are attended by symptoms common to intracranial suppuration, so that one of the most difficult problems encountered by the clinical physician in the diagnosis of chronic cerebral abscess is differentiating it from other diseases that so nearly resemble it, both in their clinical history and apparent etiology.

The following case illustrates the similarity of the symptoms of cerebral softening following thrombotic occlusion of an artery to those of cerebral abscess :

A man, aged twenty-two years, an Austrian by birth, a miner by occupation, living in Colorado four years, was admitted into the Arapahoe County Hospital, March 25, 1895, completely paralyzed in the left leg and arm and lower side of the face of the same side, the upper portion of the latter being paretic. His family history was negative, and he had always enjoyed good health up to the beginning of his present illness. He denied indulgence in alcohol further than an occasional glass of beer, and said that he had never exposed himself to venereal poison. About two months before coming under my care he suffered for two or three weeks from pain in the left side of the head and the left ear. Bleeding by the application of leeches over the left mastoid process seemed to relieve the pain, both in the head and ear. About four weeks ago he felt weak in the left arm for a day or two. The arm seemed all right on the third day, but on the fourth it became quite weak, and he began to suffer from pain in the left side of the head in the parietal region, and occasionally in the anterior temporal. Two days later the left leg was weak and awkward, and the day following the left side of the face was observed to be smooth and the mouth drawn to the right. Seventeen days ago, when he first came to Denver, from Idaho Springs, he could ascend and descend stairs, but the whole of the left side was weak, yet he could still use the left arm some, although not so well as the left leg. Two days later, or on the 10th of March, the left arm and leg and the lower portion of the left side of the face became completely paralyzed, and remained in this condition until he entered the hospital on the 25th day of March. Consciousness had never been affected.

Examination on admission. There was complete flaccid paralysis of the left arm, left leg at ankle and knee, and lower half of the left side of the face. The upper portion of the face and the hip were paretic. He could not close the left eye as tightly as he could the right. The tongue was protruded slightly to the left, and when the face was at rest the mouth was drawn a little to the right. The left side of the face seemed equally weak both for voluntary and emotional movements of the affected muscles. The deep reflexes were slightly increased on the left side, but the superficial were absent. It was impossible to make a satisfactory examination of the sensory phenomena in the absence of an interpreter. The fundi and disks of the eyes were normal. Both pupils were dilated, the left being larger than the right, and both acted feebly to light and accommodation. The axillary temperature was 98.6° F.; pulse 72; respiration 20. His mind seemed clear, and he appeared to appreciate what occurred around him. Three days later, or on the 28th, I began having the temperature registered in each axilla thrice daily, at 6 A.M., 12 M., and at 6 P.M.; and this was continued until April 12th, the time of the operation. At noon of the 28th the temperature was R. 99.8° F., L. 99.6° . It remained about the same until the next day at noon, when it was found one degree below normal, and the same in each axilla. On the 30th the temperature was found to be 100° F. in each axilla and the next two days it was normal. The pulse varied from 70 to 72, and respiration from 18 to 24.

On April 1, 1895, assisted by an interpreter, I made a more careful examination. At that time he could raise his left leg from the bed and hold it straight at the knee, but there was absolute paralysis of the muscles below the knee. The arm and face remained about the same as on the former examination. The left trunk-muscles were weaker than the right, but still retained considerable power. Dyn.: R., 120; L., 0. Knee jerks: R., absent; L., increased. Ankle-clonus: R., absent; L., present and continuous. Tendo Achillis: R., absent; L., increased and attended by clonus. Plantar reflexes: R., present; L., absent. Cremaster and abdominal reflexes: R., present; L., absent. The deep reflexes of the right forearm were slightly increased; the left were exaggerated. All the sensory phenomena were lessened on the left side, the temperature-sense being the most impaired; on the right, sensation normal. Taste and smell present on each side and about equal. Hearing with watch: R., 10/12; L., 8/12; with tuning fork hearing better in left ear. Eyes: R., V. = 20/30(?); fields—temporal normal, nasal absent up to median line; and fundus and disk presented nothing abnormal. L., V. = 20/30(?); fields—nasal preserved, temporal absent up to median line. Some obscuring of the nasal side of the disk by congestion and recent exudate. Beginning neuro-retinitis was apparent. The next three or four days the axillary temperature was about normal or slightly subnormal. On one occasion it was nearly two degrees below normal. On April 4th the left fundus and disk remained about the same as on the 1st, and the right were still normal. Power seemed to be returning in the left leg, but no change could be detected in the arm and face. Bilateral left homonymous hemianopsia was still absolute. Sensory function was greatly lessened throughout the left side, but it was most impaired in the arm. During the entire time he had been in the hospital he had complained of considerable pain in the right side of the head, extending from the anterior temporal region back to the posterior parietal. Just how long he had had pain in the right

side of the head I could not ascertain. It will be remembered that at the beginning of his illness the pain was in the left side of the head. The head-temperature had been persistently slightly elevated, and the rise was sufficient to lead me to diagnosticate an irritative lesion in the brain. From the 4th to the 12th of April the patient remained in nearly the same condition that he had been in from March 25th to April 4th, except that headache became more troublesome, and was limited to the right parietal region. The axillary temperature remained practically normal, was about equal in each axilla, but occasionally it was 0.1° to 0.2° higher in the left than in the right. As time wore on the tendency was for the temperature to be slightly continuously higher on the paralyzed side, but the difference was never more than a few tenths of a degree.

On April 10th he made a slight correction in the history of his illness. In the original history he had stated, or the interpreter had made him state, that he had pain in the left ear, and this, together with the head-pain, had been relieved by leeches applied over the mastoid region; but in his revision he said it was four months ago when he had pain in the left parietal and frontal regions of the head, and there was no pain in the ear. He reaffirmed the former statement that the pain in the left side of the head ceased on the application of leeches to the left mastoid region. About this time (or April 3d) it was observed that anæsthesia of the left side, including the face and scalp, was becoming more pronounced, and the special senses, taste and smell, were less acute than on the right side. Repeated registration of the surface-temperature of the head showed the head-temperature to be about two degrees above normal. This indicated an irritative lesion of the brain. The urine had been examined a number of times and found free from albumin and sugar, and no cardiac murmur had been detected. The young man's age was against the idea of hemorrhage; there was no cause, so far as I could detect, for embolism, and his repeated and positive assertion that he had never exposed himself so as to contract syphilis made me inclined to disregard the vascular lesions, although, in a clinical lecture on this case delivered the day before the patient was subjected to an operation, I stated that thrombotic occlusion of arteries of syphilitic origin would best explain the symptom-group. The localizing symptoms indicated two separate and distinct lesions, one in the Rolandic region on the right side, involving primarily the arm-centre, and the other in the centrum ovale of the temporo-occipital region of the same side. I argued that a single lesion in the centrum ovale so situated as to cause anæsthesia of the opposite side would affect the leg as much or more than the arm, and the face would be involved to a less extent than the leg or arm; but in this case, the face and arm being more affected than the leg, indicated that we should find two lesions. Excluding a vascular lesion, the probabilities were in favor of a tumor or an abscess. Multiple tumors in the centrum ovale are uncommon, and the absence of choked disks was decidedly against the diagnosis of tumor. In favor of abscess we had the gradual onset of the paralysis involving one group of muscles after another, and the seat of one of the lesions in the centrum ovale of the occipital lobe was the common location of abscess of pyæmic origin. No distinct cause could be found for abscess, but I consented to recommend an operation for the relief of the patient in hopes that we should be fortunate enough to find and evacuate one or more abscesses.

On the 12th of April Dr. Edmund J. A. Rogers removed a button of

bone from the skull over the arm-centre on the right side and found the brain-substance, including the cortex immediately beneath the trephine-opening, soft and diffuent, looking very much like pus. On exploring the centrum ovale in the occipital region another area of softening was found. Dr. Leonard Freeman, pathologist to the hospital, examined the material as it was taken from the brain, and his report is as follows :

"The soft, white material removed from the brain by Dr. Rogers closely resembled pus to the naked eye, but under the microscope no pus-corpuscles could be seen. A few red corpuscles were detected, but they probably came from the blood that mixed with the material during the operation. The corpuscles of Gluge were quite numerous, and some small fat-globules were observed here and there. The mass of the substance was composed of disintegrated nerve-fibres, which were rather short, and could be distinctly seen and accurately studied as they floated in the current of the fluid across the field. There were no gliomatous or other tumor-cells, and no crystals of any kind. There was no reticulated structure."

The operation was carried no further than to remove the most diffuent of the broken-down brain-substance. The wound was carefully dressed and the patient regained consciousness, and said his head felt better. About twelve hours after the operation he began to exhibit evidences of failing, and the temperature rose to 100° F. After this he lost rapidly, and died fifty hours after the operation, the temperature reaching 106° F. just before death.

Autopsy, six hours after death, performed by Dr. Leonard Freeman : On removing the iodoform gauze from the wound softened brain-substance and yellowish-whitish particles resembling disintegrated brain-substance ran out. The middle meningeal vessels on either side arose from the ophthalmic vessels. Great œdema existed at the base of the brain, especially around the cerebellum, pons, and medulla. The arteries at the base of the brain presented no evidence of disease, except on the right side, where the middle cerebral was thickened and its calibre was occluded by a thrombus at the point where the nutrient vessels to the basal ganglia are given off. The cortex of the middle and lower Rolandic region and temporo-sphenoidal lobe was softened. The cortex of the left hemisphere was negative. On cutting into the right cerebral hemisphere a large area of softening, about three inches by two in size, occupied the cortex of the middle and lower Rolandic region and the white substance beneath. The occipital lobe was the seat of a large area of softening which occupied nearly the entire white substance of this lobe. The softening in the occipital lobe reached the cortex postero-laterally. The entire corpus striatum and thalamus were softened but not diffuent. The interior of the left hemisphere presented no pathological appearances. Cerebellum and ventricles negative. The microscope showed the change in the arterial walls to be syphilitic.

In the light of the autopsy the clinical history is clear, and had not syphilis been so strenuously denied, no other diagnosis than that of arterial occlusion would have been seriously considered. It is useless to speculate whether the man knew he had syphilis ; whether he had contracted it without sexual intercourse and did not know it ; or whether the condition of his cerebral bloodvessels was due to hereditary syphilis. The latter is very improbable.

(To be concluded.)

THE DIFFERENTIAL DIAGNOSIS OF URÆMIA AND MENINGITIS, WITH REPORT OF OBSCURE CASES.

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URÆMIA is usually readily differentiated from organic cerebral disease, yet confusion may occur in atypical cases. Leube's¹ chief rule in the diagnosis of uræmia is formulated as follows: In patients with nephritis uræmic intoxication is to be assumed as the cause for nervous symptoms only when other causes can be excluded. This method of diagnosis by exclusion has served Leube well, and he considers the method important, since in the course of renal disease occasional organic nervous lesions, such as hemorrhage and meningitis, may simulate uræmia. The clinical diagnosis in such cases is often made only with a certain degree of probability.

Pre-eminent importance attaches to the presence of albumin and casts, and to the amount of urine. With typical nephritic findings in the urine the diagnosis of uræmia is usually easy. Exceptions exist in that nephritis may be unattended by albuminuria,² casts may be permanently absent (Ackermann), and uræmia may intervene when the amount of urine and urea is normal (Christison). I have had under observation for over a year a case of chronic parenchymatous nephritis in which every variety of cast—epithelial, granular, and hyaline—is constantly present, while albumin is absent for months consecutively. Liebermeister³⁸ instances a case in which immediately before a uræmic seizure both urine and urea were increased twofold. To offset this case, Biermer³⁹ reports an instance of anuria for 222 hours before uræmia appeared. Albumin alone is no proof of uræmia, as it may occur in nervous lesions; *e. g.*, meningitis, hemorrhage, epilepsy, tetanus, etc. According to Fleischer,¹ uræmia being due to cerebral anæmia, we must guard against confusion with cerebral anæmia of other origin, since lowered arterial pressure may induce both cerebral anæmia and albuminous urine. Such albuminuria is transitory and unaccompanied by casts.

When conspicuous cardio-vascular symptoms attend nephritis they become valuable diagnostic adjuvants, worthy of considerable, but not implicit, confidence. Case III. exemplifies this point (latent meningitis with albuminous urine and cardio-vascular alteration, *v. i.*). Cardiac hypertrophy predisposes to apoplexy, hemorrhages, and inflammations in various viscera, especially in the retina. Cortical irritation increases arterial tension.⁵ Moderate arterial tension increases the cardiac force, while excessive tension decreases it. Redundant toxins paralyze the

vasomotor system and the heart's strength flags by the absence of that difference in arterial tension imperative for the maintenance of the circulation, hence the multiplicity of cardiac conditions conceivable in uræmia.⁶ The pulse is slow, 40 to 60, before a uræmic attack (Thomas, Rosenstein, and Wagner), and later, after a convulsion, it is usually rapid. Early in meningitis the pulse is slow; later it is frequent.

Most important are the ophthalmoscopic findings, for retinitis albuminurica is rarely absent in chronic nephritis, leading to uræmia (Leube), and in acute uræmia the abundant albumin, casts, and œdema are sufficiently suggestive. In meningitis the pupils are mostly narrow and in uræmia dilated, yet uræmic myosis is observed.

Leube does not hesitate to admit that in certain cases the diagnosis of meningitis is for him more difficult than of any other cerebral lesion, because the complexus of symptoms varies and certain signs of meningitis occur in other intracranial diseases. Uræmia and meningitis have many symptoms in common—delirium, headache, vertigo, coma, convulsions, irregular breathing, and vomiting. Confusion is especially probable when the convulsions are localized in a few muscles, in which partial contractures, focal paralyses, and temperature appear. In such combinations the most experienced diagnostician may err. Meningitis and uræmia may coexist, yet meningitis is the least frequent of all the forms of serositis to which the uræmic patient is exposed.¹⁰ Broadly speaking, circumscribed convulsions and paralyses speak strongly for anatomical changes in the central nervous system, especially when constant, although such alterations occur rarely in uræmia. In uræmia they are chiefly fugitive. Literally I know of no focal nor general symptom or sign observed in meningitis which has not been recorded, singly or combined, in uræmia.

A synopsis of anomalous cases observed by others, with several of my own, seems in place because of meagre mention of the subject in literature. Jolly and Guinon³⁵ admit possible errors between uræmia and meningitis. Desnos³⁶ reports a case in which the patient during sound sleep was suddenly seized with dyspnœa, coma, and vomiting, and the urine showed much albumin. On autopsy the kidneys were normal, but there was a hemorrhage the size of a nut in the pons Varolii, breaking into the fourth ventricle. Rosenstein remarks that diagnosis is nearly impossible when motor and sensory symptoms occur synchronously with nephritis, which are due, however, not to urinary retention, but to a palpable disease—*e. g.*, meningitis. He cites a case: Urine 1009, much albumin, red and white blood-cells, casts, fat-granules; headache; dilated heart; coma; temperature 39.4° C.; wide pupils; no paralysis; slight twitchings of arms; autopsy disclosed nephritis plus suppurative basal meningitis. Murchison has described cases of uræmia closely resembling meningitis, presenting rigid neck, convulsions, and coma; but Gowers

remarks that the temperature is normal in uræmia, v. i. Rosenstein's experience includes a case of uræmia with œdema, but without urinary findings, presenting a typhoid appearance; the post-mortem disclosed nephritis

Stenhouse Kirkes³⁷ drew attention to the fact that not all cerebral symptoms in nephritis are functional, but that some are of organic origin—*e. g.*, apoplexy. Thus uncomplicated aphasia was found due to hemorrhage in Broca's convolution.⁹

In meningitis the breathing is frequently sighing, irregular, and of the Cheyne-Stokes type. In uræmia, asthmatic attacks, angina pectoris vasomotoria,³ a laryngeal croup type, Cheyne-Stokes breathing, and cyanosis are recorded.

The subject of temperature in uræmia is a mooted point. Many maintain it is reduced (Kien, Roberts, Hirtz, Billroth, Thaon, Hutchinson, Bourneville, Budin, Hanot, Lecombe, Behier, Lionville). Netter observed the temperature fall as low as 30° C. Others note a rise (Tarnier, Torday, Hippolite, Chauffard, Tenneson, Chantemesse). Lépine⁷ found that the temperature may rise without convulsions or inflammation, explicable by vasomotor irritation and decreased heat-elimination. Landois produced a rise of temperature by irritation of the cerebral cortex, caused by vaso-constriction. Unusually low temperature is found where vasomotor paralysis exists and effete products accumulate in the system. Strümpell⁸ observed not uncommonly a temperature rising to 39° C., irregular in type, rarely reaching 41.5°, and often associated with chills, vertigo, sweating, headache, and tinnitus aurium. Rosenstein⁹ expects low temperature only in subjects depleted by diarrhœa and vomiting. Bartels, Guyot, d'A. Robert, Dumont, and others confirm Rosenstein's position, although most authorities oppose his views.

The most concise general statement⁹ regarding uræmic nervous phenomena asserts: 1. That *paralysis* affects especially the sensorium, to a less degree the special senses, and rarely motility; 2. That *irritation* seldom selects the sensorium (*e. g.*, delirium); it mostly engages the motor paths (convulsions), and never implicates the special senses.

Uræmic convulsions are tonic or clonic. Described usually as general, they may by unusual localization resemble focal symptoms. Thus Rosenstein,⁹ Strümpell,¹⁶ and Bartels¹⁷ have found convulsions on half the body, one-half the tongue, and in the left arm and leg, with deviation of the head to the left. They have occurred with convergent strabismus,^{40, 15} facial spasm like tic convulsive (Lasègue and G. Sée), delirium, etc. Convulsions have simulated epilepsy and Jacksonian epilepsy. Nystagmus,⁴⁴ localized tremblings, and twitchings are recorded.^{41 42 43 31} Twitchings are easily overlooked before and after coma (Traube⁴⁵). Grinding of the teeth, frequently observed in meningitis, also occurs in uræmia (Strümpell and Bourdillat⁴⁶). Although tonic convulsions rarely

complicate uræmia, yet a tetanic type is recognized. The cases of uræmia of Thomas, Weiss, d'Aran, de Hausser, Rauth, and Jaccoud exhibited trismus. Avard relates a case in which convulsions on one side and contractures on the other were combined. Jaccoud¹¹ places on record three cases of spasmodic contractures of the forearm and cervico-dorsal flexors, producing opisthotonos. Convulsions and contractures have coincided upon one side of the body, and a case of flaccid hemiplegia was transformed by uræmia into hemiplegia with convulsions and contractures (Raymond).

Rigidity of the neck, rarely absent in meningitis, cannot be excluded from the symptomatology of uræmia (cases of Jaccoud,¹¹ Kussmaul,¹² Rose,¹³ Weiss,¹⁴ Coheu,¹⁵ and Thomas). The hands, usually free in tetanus, are involved in uræmia. Retraction of the head is also caused by rheumatism,⁴⁷ diseases in the medulla, aneurism of basilar artery, brain-tumors in the posterior fossa, peripheral irritation, tender cervical glands, and abdominal disturbances.⁴

Paralyses in uræmia are infrequent, so that Lesègue, Lecorché, and Talamon deny their existence. They are chiefly transitory hemiplegias. The cases assigned are cerebral œdema, capillary hemorrhage, softening, apoplexy, inflammatory foci, or cortical overstimulation by toxins. Some instances of hemiplegia are the following: Cases of Fuchs,¹³ Baginsky,²⁰ Addy (with aphasia, amnesia, and deafness²¹), Paetsch,²² Churchille,²³ Imbert-Gourbeyre,²⁴ Rego (aphasia²⁵), Lequima,²⁸ Raymond,²⁹ Charpentier,³⁰ Thomas,⁵ Blackhall, Leichtenstern, Simpson, Townsend, Rosenstein, Chauffard, and Mutenesse. Paraplegia seems to have occurred but twice.^{26 29} Jaekel in four hemiplegias found facial paralysis twice and one crossed oculomotor paralysis, with no post-mortem lesion except œdema cerebri. Other combinations are: aphasia with facial paralysis (Dieulafoy³²); glossoplegia,^{33 34} neuralgia, myosis, spasticity of arm, right facial paralysis and right hemiplegia.³¹ Dunin's⁵ cases exhibited the following focal symptoms: Case 1, unilateral spasms; 2, unilateral spasm with aphasia; 3, aphasia, both internal recti paralyzed, diplopia, nystagmus.

The following histories illustrate the difficulties met in equivocal cases:

CASE I.—Woman, aged forty years; delirious; pulse 90 to 120; fairly continuous temperature, ranging between 101.9° and 102.6°; tongue dry and coated brown; glazed pharynx; respirations 30; diffuse bilateral moist mucous râles, with signs of hypos-tasis over the lower lobes behind and at base; pulse not tense; second aortic tone slightly accentuated; arteries somewhat tortuous and rigid. The urine is ammoniacal, 1015, albuminous, but contains considerable pus and micrococci, yet no casts warranting a diagnosis of cystitis; the amount cannot be obtained on account of involuntary evacuations. There is divergent strabismus due to paralysis of the left internal rectus; there is ptosis on the left

side and right hemiplegia, complete save for the upper facial twig. The paralyses were present five days ante mortem. Clinical diagnosis—meningitis and cystitis. Autopsy—œdema of the brain; no meningitis; no cerebral lesion; arterio-sclerosis; diffuse bronchitis with hypostasis; diffuse pyelonephritis secondary to cystitis; hence uræmia.

CASE II.—Married woman, thirty-three years old; denies syphilis and abortions; mind wanders, and her accounts of the previous history and present illness are unreliable. No œdema; no leucoderma; no eruption; slight alopecia; pharynx and mouth negative; pulse, temperature, and respiration normal; reflexes somewhat exaggerated; sensation normal except some slight general hyperæsthesia, especially over tibiæ. The left abducens and left oculomotor nerves and the lower half of the right facial nerve are paralyzed; power in the extremities is apparently normal, but the mental condition makes voluntary muscular tests difficult. The urine shows hyaline and granular casts and abundant albumin, still an additional lesion in the cranium is suspected from the multiple nerve-affections, and a process at basem cranii, probably syphilis, is diagnosed. Antisyphilitic treatment futile; sudden death. Autopsy—chronic parenchymatous nephritis, with the usual macroscopic and microscopic findings; left heart dilated, but not hypertrophied; *brain absolutely negative*; hence no cerebral lesion, but uræmia.

CASE III.—Man, aged forty years; admitted to Cook County Hospital in delirium, without any history; marked arterio-sclerosis; tortuous brachials; atheromatous plaques on radials; pulse 90, tense, regular, quick; no temperature; left heart distinctly dilated; apex in left vertical nipple-line strong and heaving; the second aortic tone loud and metallic; urine heavily loaded with albumin, but no casts nor formed elements found. The diagnosis lies between uræmia and meningitis. No rigidity of neck, no ear disease, no temperature, no focal symptoms; retina negative. Because of the cardio-vascular changes and albuminuria I diagnosed uræmia. Autopsy—marked universal arterio sclerosis; atheroma aortæ; hypertrophy and dilatation of the left ventricle and to a less degree of the right; *kidneys* and other viscera wholly negative; a diffuse purulent meningitis over base and convexity originating from an empyema of the sphenoid sinuses. (V. s., regarding value of cardio-vascular signs in the diagnosis of uræmia.)

CASE IV.—A case closely resembling delirium tremens, with history of recent and ancient alcoholic excesses. Urine 1018, acid, much albumin, 1500 to 1800 cm. per diem; moderate number of hyaline, granular, and epithelial casts; history of previous anasarca and ascites; left ventricle hypertrophied and dilated; pulse very tense with appropriate sphygmographic tracings; headache, delirium, sopor, and vomiting; no convulsions, but two sudden lapses into coma, with temporary recovery; neuro-retinitis hemorrhagica; suddenly a paralysis of the right and a paresis of the left rectus internus, lasting four days, causing diplopia, disappearing for three days, recurring with right ptosis. Death. Clinical diagnosis—secondary contracted kidney, cardiac hypertrophy, and dilatation; œdema of brain. Autopsy confirmed clinical diagnosis; the cerebral œdema being very pronounced. There were no gross brain-lesions.

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REVIEWS.

AN INTRODUCTION TO PATHOLOGY AND MORBID ANATOMY. By T. HENRY GREEN, M.D., F.R.C.P., Physician and Special Lecturer on Clinical Medicine at Charing Cross Hospital, and Physician to the Hospital for Consumption and Diseases of the Chest, Brompton. Seventh American, from the eighth English edition. Revised and enlarged by H. MONTAGUE MURRAY, M.D., F.R.C.P., Physician to Out-patients and Lecturer on Pathology and Morbid Anatomy at Charing Cross Hospital. Illustrated by two hundred and twenty-four engravings. 8vo., pp. 598. Philadelphia and New York: Lea Brothers & Co., 1895.

THERE is little to be said by the reviewer on the occasion of the re-issue of a book so widely known and of such tried excellence as the one before us. His function is for the most part to bring the fact of its re-appearance to the notice of those who may be interested and to pass upon the quality of its editing.

In the present, the seventh American from the eighth English edition, we see the same familiar dress as heretofore, the same excellent typography, and on every page there is evidence of the thorough and painstaking revision which the text has undergone at the hands of Dr. Murray in the effort to bring it in line with the most recent advances in our knowledge. As the result, the book, though in some particulars retaining a somewhat disjointed presentation of the subject, may be fairly said to contain one of the clearest and best statements in the English language of our present knowledge of pathology.

The presentation of the subject is spoken of as in a measure disjointed because there is noticeable throughout the book what we believe to be an unfortunate lack of generalization. The relations of various processes closely allied to one another are not brought out as we would wish and as the present status of our knowledge of disease in its various phases would warrant.

We conceive that at the present day a work upon pathology to be thoroughly scientific should seek to present the subject in such a light that the sequence of cause and effect should be most clear. It is apt to be forgotten that the changes incident to disease are natural phenomena, and that a mechanical, or, perhaps better, a physical, basis underlies them all just as it does all other natural phenomena. While it would be absurd to hold that we are in possession of all the influences conducing to every process of disease, we are, nevertheless, able to comprehend a number in each case, and their careful study in relation to the condition which they induce throws much light on the nature of the process in question and serves to bring it in touch with the other natural phenomena of disease.

An illustration may serve to make our meaning more clear. In the

book before us the chapter on Inflammation contains a most excellent and straightforward statement of the various changes incident to that process in general and to the different so-called varieties of inflammation. In all the structural peculiarities are well stated, but we search in vain for any explanation of them. We are left unaided in our efforts to understand why in suppurative inflammation, for instance, emigration should have such an important part, and why in tubercular inflammation we should have so considerable a development of connective tissue, cheesy degeneration, etc.

Now, we hold, and have already suggested in this JOURNAL in connection with another matter, that the recent advance in our knowledge of the exciting cause of these and the other specific varieties of inflammation in which the etiological factor is known, enables us to formulate a most satisfactory correlation of cause and effect between the qualities of the specific bacteria in each case and the peculiarities of the lesion which they excite. Thus, in the case of suppurative inflammation study of the cause has shown it to include several distinct species of bacteria, often very different in many of their characteristics, but all invariably possessed of one character in common, the production in their growth of a substance possessed of marked positive chemotactic quality. Here we have at once a physical reason for the preponderant feature of suppurative inflammation. It may be that in the case of some of the germs producing suppuration the precise manner in which this positive chemotactic influence is exercised is as yet unknown, but in the most important of these germs such action has been clearly demonstrated and affords the ground for our present understanding of the suppurative process.

In the case of tuberculosis the evidence is, if possible, even more definite. The dead bodies of the tubercle bacilli have been shown to possess the power of stimulating connective-tissue growth, while the broth in which the bacilli have grown and from which they have been removed by filtration (tuberculin) has been demonstrated to possess the power of inducing exudation and cheesy degeneration. Connective-tissue growth, exudation, and cheesy degeneration, all the elements of the tubercular process, are thus found to have their *raison d'être* in qualities inherent in the germ which causes the disease, and we may further submit in explanation of the chronicity of the process the sluggish growth which characterizes the tubercle bacillus.

As before remarked, to contend that we are in possession of all the factors conducing to the production of all pathological processes, or, indeed, of any one of them, would be manifestly absurd; but we have definite knowledge of a number of such factors which has stood the most critical tests and which may safely be made use of in the elucidation of the processes with which they are associated, and we maintain that they should be so made use of to the utmost.

It is in just this working out of the relation of cause and effect that our text-books of pathology are lacking to-day, and without the indication of such relationship pathology consists of little more than a confused jumble of abstract facts, difficult to remember, and devoid of any scientific or rational inter-relationship.

Another point in which the present volume is disappointing is in its illustration. Though the illustrations are reasonably numerous, they are for the most part of very poor quality and poorly reproduce the conditions they are intended to depict. This appears to be in the main the

result of two shortcomings: They are too small to exhibit clearly the topographical relations of the lesions, and many of them are lacking in detail in cases where the intimate relation of cells and stroma should be clearly demonstrated. As instances of the former of these faults, we may cite the majority of the illustrations of lesions of the lung, kidney, liver, and lymph-nodes. Figure 75 is a striking example of both. It is supposed to represent in two cuts the structure of a scirrhous of the mamma. The cut marked *a* has about the area of a 25-cent piece, the other, marked *b*, is easily covered by a 5-cent piece; both are nearly as nondescript as far as showing any structural relations as could well be conceived. Such illustrations are worse than useless, as they occupy valuable space. We note with regret that a number of the worst of them have come down through editions as far back as 1884, and are probably of even greater antiquity. Is it possible that the editors of the various editions have been oblivious of the utter worthlessness of these plates?

A few typographical errors in a book of this size are, of course, unavoidable. We call attention to two as they render the meaning obscure and are liable to lead to misconception. These are "*now*" for *not* on page 38, bottom line; and "*oxidation*" for *exudation* on page 291, line 16.

J. S. E.

HISTOPATHOLOGY OF THE DISEASES OF THE SKIN. By DR. P. G. UNNA.

Translated from the German, with the assistance of the author, by NORMAN WALKER, M.D., F.R.C.P. Ed., with double colored plate containing nineteen illustrations and forty-two additional illustrations in the text. 8vo., pp. 1205. Edinburgh and New York, 1896.

THIS work in German was recently reviewed in this JOURNAL (February, 1895). Its appearance now in English must be gratifying to all readers of the English language. On the former occasion we expressed high appreciation of the value of the book, and perusal again in a more familiar language fully corroborates that opinion. The author has long been favorably known throughout the civilized world in connection with diseases of the skin, and especially as an earnest, indefatigable worker in pathology and pathological anatomy. As he states in the preface to the book before us, the study of pathology in connection with the skin has two very great advantages. First, we can always get fresh, living material for investigation; and, secondly, it is possible to observe the part, and to note its relation to the disease as a whole, before excision. By comparing clinical symptoms with the histological details, the macro- and microscopic appearances may be brought into harmony with each other. Under these circumstances it is easy to see that a thorough study of cutaneous pathology must have an important bearing upon general pathology. As Unna states, the aim of all of our pathology should be enlightenment of clinical study, and this observation forms the basis of the work under review. The older methods of examination of tissue are nearly all nuclear stains, many of which, especially the mitotic stains of Flemming, have been of great value in many pathological processes; but the most important changes occur in the protoplasm of the cells, where alone, in the author's opinion, can the history of many diseases be

studied. The nuclei are the reproductive organs of the tissues, and they are to be studied through specific staining-methods for the protoplasm.

The subject-matter of the book is considered under (1) Anomalies of Circulation; (2) Inflammations; (3) Progressive Disturbances of Nutrition; (4) Regressive Disturbances of Nutrition; (5) Malformations; (6) Saprophytes and Foreign Bodies.

The section on Inflammations comprises a vast array of diseases grouped into it: *a.* Traumatic; *b.* Neurotic; and *c.* Infectious; the latter including eczema, psoriasis, lichen, ichthyosis, acne, and other diseases of the sebaceous and sweat glands, and many other diseases too numerous to mention. In fact, by far the majority of all the diseases of the skin are to be found in this group.

To analyze the contents of a work so great, exhaustive, and voluminous as this is, of course, not to be attempted, but we may direct attention to one or two points in connection with the commonest disease of the skin, namely, eczema. This is considered under two distinct headings: (I.) Acute Vesicular, and (II.) Chronic. The former the author defines as the "primitive acute outbreak of eczema in the form of vesicles, which, as such, rapidly heals or passes into the ordinary common eczema—that is, a chronic skin disease." This is a very different conception from Hebra's acute eczema, accompanied by erysipelatous swelling and œdema. Chronic eczema proper is regarded as a moist catarrh of the skin, which is a uniform histological process; but the unity does not consist in a constant series of stages (papular, vesicular, rubrum, etc.). A uniform complex of three histological symptoms is really the basis of every eczema; these are: (I.) the scale-formation (parakeratosis); (II.) the papule-formation, or the epithelial growth (acanthosis); and (III.) the vesicle-formation, or the spongy transformation of the epithelium.

It is notable with eczema as with other diseases that the histo-pathology is approached from a novel standpoint, familiar, however, to those readers who have followed the distinguished and brilliant author throughout the dermatological literature of the past fifteen or twenty years. Upon every page we note evidences of minute and careful study with the modern methods of research, with the result that with each disease a new page of information is unfolded. There exists an extensive chapter devoted to the histo-pathology of the syphilitic cutaneous manifestations, which is much the best work that has ever been published on the subject. Preceding almost all the diseases considered there is a short statement of the clinical features, which serves as a guide to the main work, so that one is never left in doubt as to the precise clinical picture which is being discussed from the histo-pathological standpoint.

We earnestly commend the book to all interested in general pathology, as well as to dermatologists, and while we cannot agree with some of the ultra views put forth by the distinguished author, we have no hesitation in stating that a great wealth of valuable information is contained in the volume. It is the most remarkable and valuable work that has ever been written on the subject, and contains an almost inexhaustive fund of knowledge upon which pathologists will draw for many years to come.

The translation, in itself a great undertaking, has been done by the skilful hand of Dr. Norman Walker, of Edinburgh, formerly a favored pupil of Dr. Unna in Hamburg, and leaves absolutely nothing to be desired. The reading is intelligible, plain, and free from German idioms.

We question whether another translator so particularly well trained and equipped for this task could have been found.

The illustrations are new and are chosen to represent some of the many novel features discussed, but the reader must not expect to find an atlas. The text is infinitely more important than the drawings, which, we may observe, are not numerous, considering the magnitude of the book.

The publisher (Mr. William F. Clay, of Edinburgh) has given a very elegant volume from the standpoint of paper and type. An index of diseases with many references completes the book. We again cordially commend the book to all who are interested in scientific medicine.

L. A. .D.

EPIDEMIC OPHTHALMIA: ITS SYMPTOMS, DIAGNOSIS, AND MANAGEMENT.
WITH PAPERS UPON ALLIED SUBJECTS. By SIDNEY STEPHENSON, M.B.,
F.R.C.S. Ed. Edinburgh and London: Young J. Pentland. New York:
McMillan & Co., 1896.

DR. STEPHENSON is a recognized authority on all subjects pertaining to contagious inflammatory affections of the conjunctiva, and he is much to be congratulated upon having gathered together the literature of this subject, which is carefully analyzed and sifted, and still more to be congratulated upon having added to it the results of his own ripe experience.

Under the title "Epidemic Ophthalmia," which might be more suitably replaced with the words "epidemic conjunctivitis," the following diseases are included: Muco-purulent or catarrhal ophthalmia, purulent ophthalmia, diphtheritic ophthalmia, and acute trachoma. Of muco-purulent conjunctivitis two varieties are described, the ordinary infectious conjunctivitis which is common in the spring and autumn, and that conjunctival inflammation which the older writers were accustomed to call "pustular," or "aphthous ophthalmia." Dr. Stephenson regards the latter as an affection distinct from a true phlyctenular conjunctivitis.

Purulent ophthalmia, which includes ophthalmia neonatorum and gonorrhœal ophthalmia, is considered always to be due to a contagion, and true diphtheritic ophthalmia to the presence of the Klebs-Loeffler bacillus. While acute trachoma is believed to arise through the agency of a specific contagion, the exact nature of the micro-organism, or possibly the parasitic protozoa, has not been determined. In this connection the following significant sentence occurs: "However trachoma begins, it is, in my judgment, a malady that originates in contagion and in that alone. I no more believe in its spontaneous evolution than I do in the *de novo* origin of measles or of ringworm."

A brief summary of this author's views of the origin of these conjunctival inflammations is contained in the following quotation: "Of the four acute affections, then, grouped together under the common name epidemic ophthalmia, three arise from contagion, viz., purulent and diphtheritic conjunctivitis and acute trachoma. With regard to the fourth, catarrhal ophthalmia, whatever be its origin, it spreads, at any rate, by transfer of discharge. A proper knowledge of these facts underlies all successful preventive treatment and furnishes us with a clue to many precautions that might otherwise seem unnecessarily tedious and

minute." The bacillus of Weeks is described, and its presence considered to indicate that the case is one of catarrhal ophthalmia. We are of the opinion that the author might have gone further and declared this micro-organism to be the specific cause of epidemic conjunctivitis.

Stephenson agrees with Raehlmann that these contagious types of conjunctivitis are incapable of atmospheric dissemination, and therefore all preventive measures should be based on a theory that contagious eye maladies are spread by the direct or indirect conveyance of specific discharges from eye to eye. The most likely agents in passing on infectious particles are washing utensils, hands and fingers, handkerchiefs, bed-linen, body-apparel, animals, and miscellaneous agents.

This portion of the book concludes with a full consideration of the management of outbreaks of epidemic conjunctivitis in schools, asylums, and similar institutions, the education of those suffering with ophthalmia, and contains full directions for securing proper medical inspection and hygienic arrangements.

The next chapter comprises, according to its title, a clinical inquiry into the prevalence and significance of the follicular granulation of the conjunctiva, and discusses fully the vexed question of the relation of follicular conjunctivitis and folliculosis to trachoma. Dr. Stephenson concludes that the follicular granulation does not constitute the initial stage of the specific disease trachoma; that it is not necessarily an immediate and direct outcome of an unhealthy environment; that there is no decisive evidence that it predisposes to trachoma; that in all likelihood it is an expression of what he terms the "adenoid activity" of young subjects, being comparable to the follicular projection of the pharynx.

The chapter on the Treatment of Trachoma and its Complications opens with a very interesting introductory sketch of the history of this disease and the methods which have been practised for its cure. This is followed by the various plans of treatment which have been of particular service to Dr. Stephenson. His most important conclusions are as follows: Bluestone and lunar caustic are the most trustworthy escharotics; expression is an operation of great value and deserves a permanent place in the treatment of trachoma; excision of the upper cul-de-sac is worthy of trial in cases of trachoma that resist ordinary methods of treatment; a combination of surgical and escharotic methods not infrequently forms the speediest, safest, and the most rational means of attacking the disease. The last quotation deserves emphasis, because one reason of the lack of success in many operations for trachoma consists in the failure to carry on the medicinal treatment of the case after the completion of the operation.

The complications of trachoma receive full consideration, both in description and treatment, and a special chapter is devoted to the treatment of follicular conjunctivitis. Dr. Stephenson prefers ointments containing lead, and his usual plan is to commence the treatment with a 1 per cent. ointment of the subacetate, which is gradually increased in strength to 5 per cent. Expression is also employed, but only when the growths are of comparatively large size. If much discharge is present, he uses a tepid solution of corrosive sublimate, 1 to 5000.

The book concludes with an Appendix, well illustrated, describing the proper lavatory arrangements in schools, barracks, and asylums, and also the proper management of the accessories—towels, sponges, and the like.

We commend this excellent book not only to every physician whose

practice is likely to bring him in contact with the diseases which are described, but also to superintendents, officers, and managers of almshouses, asylums, children's homes, and similar institutions, in which it is essential to endeavor to prevent the entrance of epidemic conjunctivitis, and in which, if the disease has already found a footing, all measures to stamp it out of existence should be employed. G. E. DE S.

GESCHICHTE DER VOLKSEUCHEN WACH UND MIT DEN BERICHTEN DER ZEITGENOSSEN, MIT BERÜCKSICHTIGUNG DER THIERSEUCHEN. Von DR. B. M. LERSCH. Pp. 445. Berlin: S. Karger, 1896.

THIS is an extremely valuable reference-book, the preparation of which must have involved an enormous amount of reading and research. It presents a history of epidemic diseases from the earliest to the present time, giving the dates and main facts of outbreaks of these diseases wherever occurring. Many of the most important and widespread epidemics are described in great detail, with full accounts of symptoms, treatment, meteorological conditions, and other matters of interest. The insertion of full references to authorities would have added greatly to the value of the book for other workers in the field of epidemiology. In a very great number of instances, for example, no authority whatever is given and this omission is inexcusable. C. H.

DEAF-MUTISM. A CLINICAL AND PATHOLOGICAL STUDY. By JAMES KERR LOVE, M.D., Aural Surgeon to the Glasgow Royal Infirmary; Honorary Aurist to the Glasgow Deaf and Dumb Institution. With Chapters on the EDUCATION AND TRAINING OF DEAF MUTES, by W. H. ADDISON, A.C.P., Principal of the Glasgow Deaf and Dumb Institution. Pp. 369. Glasgow: James MacLehose & Sons, Publishers to the University, 1896. New York: Macmillan & Co.

CHAPTERS I. to VIII. are the work of Dr. Love, and are the only ones that appeal to the medical man. The work as a whole is emphatically one to be studied by teachers of the deaf and dumb. The name of the book should be Deaf-dumbness, and not "Deaf-mutism." The latter is a translation of the French "Surdmutité," and we could never understand why English writers preferred it to honest English "deaf-dumbness." The Germans command our respect with their word "Taubstummheit." Why do not our English writers show similar regard for their own language and use pure English when they can?

The chapter on Diagnosis, Prognosis, and Treatment of "Deaf-mutism," or the "surdism"—*i. e.*, the deafness of the mute—is very inferior to what it might have been had the author shown any knowledge of what might be done to relieve the deafness of the mute. The latter can certainly be done in the acquired cases, especially in many instances of purulency. Not one suggestion is made that such aid may be given to a mute, just as it is in many cases of deafness in those not mutes, by intratympanic operations. And it must be remembered that any improvement in hearing enables the deaf-mute to acquire more easily lip-reading and articulation. The author of this chapter either knows nothing about

such operations or suppresses what he knows. He contents himself with treatment of the nasopharynx. His indifference to any rational treatment of the ear in the deaf-mute may be due to his view (p. 181) that the deafness in the mute "is generally due to damage to the internal ear, the auditory nerve, or its connections in the brain"—a statement, however, which cannot be substantiated, at least in the acquired cases with purulency.

The book is well written and handsomely printed and bound.

C. H. B.

LES SUPPURATIONS DE L'APOPHYSE MASTOÏDE, ET LEUR TRAITEMENT. Par A. BROCA and F. LUBET-BARBON. Pp. 259. Paris : G. Steinheil, 1895.

THIS work, which shows care and industry in observation and recording cases of mastoid disease, is divided into an introduction and four chapters. The latter are denominated Mastoid Abscesses, Mastoid Fistule, Chronic Suppurative Otitides, with Latent Mastoiditis, and a chapter on Results.

The first chapter is subdivided into (1) Sketch of the Pathological Anatomy and Physiology, (2) Symptoms, (3) Diagnosis, (4) Therapeutic Indications, and (5) Treatment of Acute Mastoiditis.

The second chapter is subdivided into (1) Physical Signs and Osseous Lesions, (2) Therapeutic Indications and Surgical Operations, and (3) Intracranial Complications.

The third chapter is not subdivided, but the fourth chapter is divided into (1) Cases, (2) General Statistics, and (3) Results According to the Nature of the Lesion.

The authors make the term mastoiditis, or mastoid abscess, very comprehensive, placing under it many comparatively trifling affections of the soft parts of the mastoid and intramastoid processes which have terminated safely and spontaneously beneath the soft tissues of the mastoid cortex. It also seems from a scrutiny of the notes of cases that in many instances the so-called mastoid abscess or fistula was the result of an irritant and secondarily infectious treatment of the inflamed ear. Viewed in the light of the recent papers upon antiseptic treatment of ear disease by Gradenigo and Pes, in Italy, and Lermoyez and Helme,¹ in France, this work under review belongs to the period of what may be termed "septic aural surgery."

C. H. B.

SPECTACLES AND EYEGLASSES: THEIR FORMS, MOUNTING, AND PROPER ADJUSTMENT. By R. J. PHILLIPS, M.D., Ophthalmic Surgeon to the Presbyterian Hospital in Philadelphia, etc. Second edition, revised, with forty-nine illustrations. Philadelphia: P. Blakiston, Son & Co., 1895.

THIS excellent manual, which has reached its second edition, continues to be the best book on the subject of which it treats. It should be read by everyone who is interested in that most important portion of the ophthalmic surgeon's work—the supervision of the proper adjustment of spectacles. It is doubly useful for those practitioners of ophthalmology who are unable to command the services of a skilled optician.

G. DE S.

¹ See this JOURNAL, July, 1895, pp. 104, 105.

A PICTORIAL ATLAS OF SKIN DISEASES AND SYPHILITIC AFFECTIONS. In Photo-lithochromes from Models in the Museum of the Saint Louis Hospital, Paris. With explanatory woodcuts and text. By ERNEST BESNIER, A. FOURNIER, TENNESON, HALLOPEAU, DU CASTEL, HENRI FEULARD, and LEON JACQUET. English edition, edited and annotated by J. J. PRINGLE, M.B., F.R.C.P. Part II. London: The Rebman Publishing Co. Philadelphia: W. B. Saunders, 1896.

THE first plate in Part II. of this most promising *Atlas* is one of lupus erythematosus, portraying the disease on the nose, cheeks, and ear. This case and accompanying notes are presented by Hallopeau. The representation of this disease is most life-like. A woodcut of the same is also given with explanatory references to the parts, showing the different stages of the process. As supporting its asserted tuberculous nature, it is stated that the patient had lost one brother and one sister from tuberculous disease, and that the patient himself had in childhood suppuration of a cervical gland. The next plate shows hypertrophic rosacea of the nose and lower and middle forehead, in which regions the skin forms veritable convoluted masses, resembling the frontal leontiasis of leprosy. The case and notes are presented by Besnier. This illustration is presented as that of a rare case, and will be of much interest to dermatologists. The third plate exhibits a circinate papulo-squamous syphiloderm, the eruption being in great profusion. The plate shows the face. Woodcuts of two other cases are also given—one showing papulo-squamous patches on the back of the hand and wrist, and the other exhibiting enormous syphilitic patches of a papulo-crusty form on the anterior trunk. The fourth, and last, plate of this part is one showing xanthoma planum et tuberosum. The plate presents one-half of the upper face and forehead and the palm of the hand of the same patient. In the former xanthoma of the eyelid and adjacent region is most satisfactorily depicted. That on the palm is also well shown, but this is a rare site for the disease and is not so valuable, therefore, from the everyday physician's standpoint. The case and notes are given by M. Darier. The patient was "glycosuric, icteric, and obese." This completes Part II. It further emphasizes the fact that this publication is a most admirable and artistic one; the coloring is true to nature, and the histories given and the clear explanatory text add materially to its value.

H. W. S.

THE FUNCTIONAL EXAMINATION OF THE EYE. By JOHN HERBERT CLAI-BORNE, JR., M.D., Adjunct Professor of Ophthalmology in the New York Polyclinic. With twenty-one illustrations. Philadelphia: The Edwards & Docker Co., 1895.

DR. CLAIBORNE'S little book, according to a statement in the introduction, is the result of a course of lectures delivered to the students of the New York Polyclinic. It is elementary, and written in an easy, colloquial style, which the author informs us he has adopted because he believes he can by it make his meaning more clear. The book describes the faculty of vision, the method of conducting an examination, a few of the properties of lenses and prisms, and then devotes itself to the

correction of astigmatism and presbyopia. The chapter on Presbyopia is the best one in the book. If the correction of errors of refraction, particularly of astigmatism, was really as non-laborious an occupation as Dr. Claiborne's sentences make it appear, what a saving of time there would be in the practical ophthalmic surgeon's office!

A good many surgeons will not agree with Dr. Claiborne's view of the mydriatics. Personally we are inclined to believe with him that homatropine and atropine sulphate are sufficient for all practical purposes. We do not believe, however, that it is an advantage to add cocaine to the homatropine solution. Neither do we believe that there is any difficulty in prescribing a glass during the effect of a mydriatic, provided a proper examination of the functions of the eye and the balance of the external ocular muscles has been made before the mydriatic was instilled. These examinations are omitted in Dr. Claiborne's book. We regret that the author should not have made his manual somewhat larger, and included the examinations of muscles, the field of vision, the field of fixation, and the estimation of the color-sense and the light-sense. The title of the book entitles the reader to expect a description of these topics.

G. DE S.

A MANUAL OF OPERATIVE SURGERY. By LEWIS A. STIMSON, B.A., M.D., Surgeon to the New York, Bellevue, and Hudson Street Hospitals; Professor of Surgery in the University of the City of New York, etc., and JOHN ROGERS, JR., B.A., M.D., Assistant Demonstrator of Anatomy in the College of Physicians and Surgeons, New York; Surgeon of the Out-patient Staff, Hudson Street Hospital. Third edition. New York and Philadelphia: Lea Brothers & Co., 1895.

THE whole of this work has been thoroughly revised by the junior author. A large number of well-executed cuts and about one hundred pages of text have been added. The descriptions of many operations formerly in vogue have been omitted, and a more lengthy and detailed description given to the ones substituted. The author has confined himself to the practical aspect of treatment by operation. The indications are not dealt with, neither is included the preparation of the patient or the after treatment of the case.

The section devoted to the cranium and abdomen has been entirely rewritten and brought up to the requirements due to the advances in this important branch of work. The chapter dealing with plastic operations is well illustrated, clear, concise, and thoroughly practical, dealing with all that is really essential and important.

On the whole, we can commend the book as a useful and practical guide to the most important surgical operations. It is by no means an exhaustive treatise, yet it is eminently readable, and should be appreciated by all students and practitioners who wish to obtain a clear and comprehensive insight into any operative procedure. The publishers' share in the production of the volume is deserving of all praise. The paper is good and the printing neat and more than ordinarily accurate.

R. H. H.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

THE TREATMENT OF PULMONARY TUBERCULOSIS BY INJECTIONS OF GUAIACOL AND IODOFORM IN STERILIZED OLIVE OIL.

DR. BRETON has made use of this method for fourteen months, observing thirteen patients who received in all one hundred and fifty injections. Of these patients five, in the last stages of the disease, have died. The formula is: Guaiacol, 5; iodoform, 1; sterilized olive oil, 100. The injections are made into the abdomen or flank, with all antiseptic precautions. The amount is gradually increased from fifteen drops to three or four times that amount, and repeated every eight to ten days. The inconvenience is a persistent, burning pain. It is contraindicated during congestive attacks, when there is fever or hæmoptysis, or even small masses of blood in the expectoration; when there is intolerance or momentary saturation, or when albuminuria supervenes. The results obtained are a diminution and later disappearance of the thoracic pain; the dyspnoea is relieved; the cough, especially the nocturnal, becomes less frequent and less painful; the expectoration is less abundant, less discolored, although the bacilli are not diminished in number; the appetite is re-awakened, and at the same time the general condition improves; the sweats are less abundant, and, finally, auscultation shows that real progress is being made.—*Journal des Praticiens*, 1896, No. 9, p. 134.

THE ACTION OF SODIUM BICARBONATE.

M. G. LINOSSIER considers the action of this substance upon the gastric secretion, particularly in relation to the memoir of Reichmann. The immediate action is the total or partial alkalization of the stomach-contents; this is produced without any participation of the gastric mucous membrane. Its physiological action consists in an excitation of the glandular cells of the stomach, which has for its result an exaggerated secretion of hydrochloric acid. The reasons for the errors which have been made in regard to this late

action are to be found in the fact that only a single examination has been made. If this has been done prematurely, before the alkalinized gastric fluid has reacquired its alkalinity, then the conclusion has been reached that its action is depressive; or if the examination is made at the moment when the normal acidity has been neutralized, the conclusion is that it has no action; or, further, if the examination has been made late, and only if the dose is suitable, it may be said to have an excitant action. Reichmann made only a single examination, and in general an early one, sometimes about ten minutes after ingestion, more often after thirty minutes, and exceptionally after one and a half to two hours. Further, he made the error of not experimenting upon the same patient with variable doses, and of generally employing insufficient doses to provoke a notable excitation of the secretion. For these reasons, and the additional one that the duration of his experiments was too short, the result was that he reached the opinion that its action was either depressive or at least *nil*. The remote action of the drug can be summed up as follows: The sensibility of its action is in inverse ratio to the richness of the hydrochloric acid in the gastric secretion.—*Bulletin Général de Thérapeutique*, 1896, 4e liv., p. 155.

THE THERAPEUTIC ACTION OF SALICYLIC ACID AND THE SALICYLATES.

M. G. PONCHET states that salicylic acid diminishes the activity of protoplasm, slows the organic processes of formation or retrogression, acts upon formed and soluble ferments, arrests the amœboid movements of leucocytes, and suspends diapedesis. On the other hand, thirty to forty-five grains produce cerebral congestion, accompanied by symptoms analogous to those observed from quinine-intoxication, notably tinnitus, disturbances of vision, and headache. Occasionally these attain to deafness and vertigo due to congestion of the middle and internal ear, which rarely may go on to true inflammation. Large doses produce hallucinations, delirium, profuse sweating, vomiting, and collapse. The kidneys may be the seat of hæmaturia, of hemorrhage, and albuminuria. In a healthy man neither pulse nor temperature is changed. But in animals, after poisonous doses, there is a marked depression of the vascular tension, paralysis immobilizes the organs of respiration, and death follows convulsions, caused by carbon-dioxide poisoning. In man, if ingested by the stomach, the sharp taste and vigorous irritation of mucous membrane, which may go on to nausea and vomiting and give place to burning sensations, are noted. Sometimes colicky pains, accompanied by diarrhoea, follow its administration to dogs. These symptoms should not be produced in man if the injunction, never to prescribe the sodium salicylate in powder or in concentrated solution, is followed. The only inconvenience, if the drug is properly administered, lies in a temporary intolerance, after prolonged administration, showing itself as a disgust for food as complete as after the use of an alkaline water or after alcoholic drinks. Salicylic acid is diffused through the organism with great rapidity; in healthy individuals it stimulates the urinary flow by irritating the renal epithelium, as does potassium nitrate, but this effect is diminished as inflammation develops. In inflammatory conditions of the kidneys and in severe general affections this secretion may be retarded or diminished; for instance, in typhoid patients

it may produce a true urinary break-down. We find the urinary solids increased, phosphoric acid, the sulphates, carbonates, and preformed sulphates, the latter and, as a consequence, the phenol show that some of the acid has undergone decomposition. There is also a remarkable elimination of uric acid, even more notable than that produced by lithium; in fact, lithium salicylate is an excellent evacuant of the urates. The saliva is sometimes, the perspiration and bile always, increased. Sodium salicylate is an energetic cholagogue in small doses, fifteen to thirty grains; it increases and liquefies the bile, attaining its maximum action in two to three hours after its administration; but gentle purgatives should be associated with it to stimulate intestinal peristalsis. However, it may give rise to hepatic congestion more or less intense, sometimes obliging the discontinuance of the drug.

The physiological action of salicylic acid can be summed up in the statement that it diminishes the vital activity of protoplasm. It is a specific in acute articular rheumatism and in gout, showing itself by a special action exercised not upon a cause still unknown in its real essence, but on account of the power of the anatomical element to sustain this cause and react under its influence. This, however, does not exclude a true specific action upon a cause still unknown, analogous to that exercised by quinine upon the blood-parasites of paludism or mercury upon syphilis. Besides this specific action, which may be called a special antiseptic, there is a general antiseptic one, which may be useful in variola, diarrhœa, diphtheria, and orchitis after blennorrhagia. It is antithermic, but this is not a therapeutic property, for it is the first symptom of the toxic action. To characterize in few words the remarkable specific action of this drug: It is a remedy of a symptom, and not of a diathesis; its use relieves only temporary accidents, preventing neither their production nor return, nor indeed their complications, as does quinine the accidents of paludism, or mercury those of syphilis.—*Les Nouveaux Remèdes*, 1896, No. 3, p. 57, and No. 4, p. 89.

THE EFFECT OF DIPHTHERITIC TOXIN UPON THE HISTOLOGICAL ELEMENTS OF THE NERVOUS SYSTEM.

DOTT. CARLO CENI, from his studies, concludes that in patients dying of diphtheria we cannot always recognize appreciable morphological changes in the nervous elements, especially if death has taken place early. Experimentally in rabbits subjected to inoculations with diphtheritic bacilli or to injection with diphtheria toxin, death is constantly accompanied by marked morphological alteration in the nervous elements. The intensity of the alteration depends not so much upon the amount as the duration of the toxic action. In patients the general rule is that these changes are limited to the protoplasmic prolongations, leaving unaltered the cell-body and the nervous prolongations. Only in rare, special cases, through prolonged action of the diphtheritic toxin, the atrophic process of the nervous elements presents itself in a more advanced state, indicating alterations in form, both of the cell-body and nervous prolongations. In patients dying of diphtheria the incipient atrophic process of the nervous elements is limited to a few isolated cells disseminated through the encephalic mass; in animals, on the other hand, it extends to diffuse groups of cells, acquiring the character of a diffused

alteration, more marked especially if death has taken place by slow poisoning. Individual conditions of acquired immunity show remarkably that these elements require an enormous resistance against the deleterious action of the diphtheritic toxin. Animals refractory to diphtheria can tolerate in their circulation even five hundred times the fatal dose of toxin without producing any change in the nerve-centres or elements.—*La Riforma Medica*, 1896, Nos. 29, p. 338; 30, p. 351; 31, p. 363.

THE PREVENTIVE ACTION OF QUININE IN PALUDISM.

M. LABORDE believes that this is no longer in doubt. If this is not everywhere admitted at present, it is because the rational indications have not been studied and the choice of preparation, its form, and appropriate dose made out. In general, too small doses and too long intervals have been the sources of failures. In general, one and one-half to three grains every day, according to the severity of the service, seem to be sufficient. The objection to the continued use of the drug that it presents, among other inconveniences, that of habituation, so that its specific activity may be lessened or abolished at the time when its intervention is absolutely necessary, is not of sufficient weight to induce complete reliance to be placed, as do Kelsch and Kiener, upon the habit of not exposing one's self, when fasting, to fever-producing emanations, and the use of tonic drinks, coffee, tea, and alcohol in small doses.—*Journal des Praticiens*, 1896, No. 10, p. 155.

THE GASTRIC CRISES OF TABES DORSALIS.

M. H. HUCHARD calls attention to the fact that in 1885 Sahli noted that these crises depended upon an attack of deficient hydrochloric acid, and should be treated by sodium bicarbonate, two and one-half to three and one-half drachms *per diem*. More recent work tends to point out that the proper treatment during the crises and hypopepsia is absolute rest, and, for food, undercooked eggs, some vegetable *purées*, crust of bread, and, for drinks, water, but no milk. During the period of quiescence or hypopepsia (hydrochloric acid equalling zero), sodium bicarbonate in from fifteen to thirty grains, an hour before meals; a solution of hydrochloric and lactic acids (hydrochloric acid, 1; lactic acid, 5; water, 500); a Madeira glass, after meals. For food, *purées* of feculent vegetables, some meats well cooked, boiled and chopped eggs, and water to which is added a little wine.—*Journal des Praticiens*, 1896, No. 8, p. 114.

GUAIACOL AS A TOPICAL APPLICATION IN DIPHTHERIA.

DR S. SOLIS-COHEN states that this drug early used seems to destroy the bacilli and prevent the spread of the pseudo-membrane. Bacteriological examination of cultures taken from the same throat before and after its application has shown in the first instance the bacilli, and in the second none have been found. The formula is guaiacol, 10; menthol, 1; sterilized olive oil, 10. The same application is of service as a prophylactic against diphtheria by application to the throat of the healthy inmates of the house

in which the disease has appeared. This has been proved by Elwyn in two epidemics. In folliculous tonsillitis it is capable of cutting short the disease if early and thoroughly applied, and even in parenchymatous tonsillitis mitigates considerably the severity of the affection.—*Philadelphia Polyclinic*, 1896, No. 16, p. 157.

A POSSIBLE EXPLANATION OF SUDDEN DEATH AFTER THE ADMINISTRATION OF DIPHTHERIA ANTITOXIN.

DR. C. B. FITZPATRICK suggests that the cause of death of a male infant, aged twenty-one months, who died suddenly while in perfect health, in consequence of an injection of this substance, may have been due to the carbolic acid which is known to have been present. This is present to the amount of 5 per cent., and the dose administered contained between three-fourths and four-fifths of a grain. The patient in question received about five times the safe dose, and, inasmuch as the minimal fatal dose is unknown, perhaps a fatal dose.—*The Medical Record*, 1896, No. 1328, p. 571.

THE TREATMENT OF CANCER AND SARCOMA BY FORCED ALIMENTATION AND THE USE OF THE TOXIN OF ERYSIPELAS.

DR. B. H. DETWILER reports five instances. Hypernutrition was instituted in the form of large quantities of concentrated peptonized liquid food, with from one to two pints daily of a very superior old port wine, independent of the usual food. The cases were: 1. Cancer of the spine by metastasis from the breast, with a renewal of the disease in the cicatrix of the breast. 2. Cancer of the uterus. 3. Ulcerating surface after removal of one breast, with involvement of the other. 4. Immense sarcoma of liver. 5. Rapidly growing sarcoma of the neck. So far as the toxin injections were concerned, they were barren of results, although there were temporary good effects from the hypernutrition.—*Therapeutic Gazette*, 1896, No. 3, p. 149.

THE TREATMENT OF ENTERITIS.

DR. EDWARD P. DAVIS states that in the artificial feeding of infants cleanliness, the scalding (not boiling) of milk, and its administration at regular intervals are essential. In weakly, marasmatic babies the milk should be partially digested; this is readily done with the peptogenic milk-powder. Barley-water, 1 to 32, is a valuable addition to the diet, exerting an astringent action in case of diarrhoea. Oatmeal-water of the same strength exerts a laxative action. If the child vomits, is feverish, and has frequent stools; the milk should be stopped altogether for twenty-four to thirty-six hours and albumin-water substituted. The latter is prepared by adding the white of one raw egg to eight ounces of water; in addition, the child should get light chicken- or mutton-broth or freshly extracted beef-juice. Brandy and water form a good stimulant, and may be administered in ten-drop doses six or eight times daily. The administration of a dose of castor-oil, guarded by some brandy to prevent griping, is of exceeding value to clean out the irritating material from the intestines. Lavage of the intestines is of first importance in intestinal infantile disorders. It is accomplished by the use

of a No. 11 or 12 soft-rubber catheter and a fountain-syringe, with one or two quarts of warm water. The best result is obtained if the infant is placed on its abdomen across the nurse's knees, the water being at a temperature of 100° F., and a little soda or salt added to it. Great relief is obtained from the evacuation of the flatus and feces. In chronic cases some antiseptic must be added to the water. For each quart of water the following may be added: Boric acid, four drachms; creolin, thirty drops; sodium salicylate, ten grains; thymol, seven and one-half grains; or mercuric chloride, one and one-half grains. The last should be followed by irrigation with warm water. The irrigation of the intestines not only cleanses them, but exerts a stimulant action upon the bowel.—*The Philadelphia Polyclinic*, 1896, No. 3, p. 221.

THE USE OF GLYCERIN FOR HEPATIC COLIC.

DR. CLEMENTE FERREIRA presents a strong plea for the use of one-half to one ounce of this substance, diluted with water, as an excellent resource against the painful attacks. If administered at the outset, it may abort them and even bring about a respite of long duration from the attacks.—*Bulletin Général de Thérapeutique*, 1896, 8 liv., p. 251.

THE TREATMENT OF THE DYSPEPSIAS.

DR. ALBERT ROBIN divides the premonitory dyspepsias into (1) those caused by excess of fluids and (2) excess of peptones. The latter can be readily relieved by a diminution of the quantity of food eaten. With the former there is a difficulty, because a sudden suppression of the abundant drink frequently gives rise to a very disturbing vertigo. The better plan is to allow the patient to drink according to his desire only, one or two hours after the meal. The true dyspepsias may be divided into (1) gastric hypersthenia; (2) hyposthenia or weakness; and (3) vicious fermentations. The first class is divided into those of (1) neurotic origin (without lesion); (2) central nervous origin; and (3) gastric or reflex. The first of these has been named gastroxynsis by Rossbach, and should be treated expectantly and particularly by hygienic methods; absolute intellectual repose, open-air exercise in the country, in the mountains for excitable patients, but for those in need of stimulation at the seashore. For the second, in connection with hysteria, tabes dorsalis, or general paralysis, great difficulties are encountered. The pain should be allayed by the usual means, and milk given in small quantities is well borne in the interval, but not during the crises. In the third there is greater opportunity for success. The antiseptics should be discarded, because they interfere with the action of the soluble ferments. The usual remedy is sodium bicarbonate, in order to saturate the free acids of the gastric fluid, but rather in small dose, in order to avoid the production of a large amount of sodium chloride, from which hydrochloric acid can be elaborated. To suppress the condition of the crisis, that is to say, to neutralize the excess of acidity, chalk, or, better, magnesia is used, and with the additional advantage that it is of itself an excellent laxative. The formula employed is: Calcined magnesia, 22; bismuth subnitrate, 3 to 10; morphine hydrochlorate, $\frac{1}{8}$ to $\frac{1}{32}$; sodium bicarbonate, 15; lactose, 7 grains. This is

to be taken in one dose, in water, at the moment of the attack. In addition, hydrotherapy renders good service. In the treatment of permanent gastric hypersthenia, of which the most striking symptom is *hyperchlorhydrie*, it is not necessary to saturate the excess of acid by large doses of alkaline bicarbonate; but rather we should use calcined or hydrated magnesia, given in small doses and three or four hours after the meal, at the time that the albuminoids are digested and the syntonins are being formed. Further than this, the excess of hydrochloric acid can be saturated by taking before each meal one or two cachets containing washed sulphur, 2; potassium bitartrate, 15; and magnesia, 3 grains. In other cases the same result may be obtained by the use of salts of the organic acids or cream of tartar, potassium bitartrate, *sel de Seignette* [potassium and sodium tartrate], in thirty to forty-grain doses, thrice daily, which are eliminated as alkaline carbonates. Rarely, in acute attacks, it may be necessary to administer milk or raw eggs, three or four hours after the meal, to fix, with the contained albumin, the hydrochloric acid and prevent its action upon the mucous membrane. Gastric excitability may be relieved by a milk diet for about a week. Later, two to six eggs underdone, finally reaching ordinary diet in about a fortnight. Fish, especially the lean, with lemon only as condiment, are preliminary to a full diet. Various indigestible substances, acids (exception noted above), raw vegetables and fruits, all of the cabbage family, butter, cheese, smoked meats, long-kept game, truffles, wines, and alcohol are prohibited. Pure water is best for drinking; next comes those feebly mineralized, and skimmed milk. Light beers are good, provided they are well fermented and are not acid. Coffee and tea are allowed if their use is not followed by nervous excitement. The pathological phenomena which we must combat are (1) hypersecretion of the mucous membrane, which exceeds the physiological necessities, and an exaggerated afflux of blood; and (2) rarely a diminished amount of pepsin. For the first indication, to diminish the reflexes may be given veratrum viride, cocculus indicus, cannabis indica, opium, belladonna, or cocaine—the last with great care and in small dose. For the hyperæmia, ergotin, 3, in distilled water, 4; dissolved, filtered, and mixed drop by drop with tincture of cocculus indicus, veratrum viride, belladonna, and anise, of each, 5; and of this six to ten drops before the two principal meals. For the second condition, pepsin, capable of digesting fifty times its weight of fibrin, 5; with diastase, 2 grains; and in addition pancreatin, in two to four-grain keratin-coated pills, may be given. Various springs also are apparently of benefit in these conditions. The treatment of gastric hyposthenia or functional insufficiency, showing itself in a diminution of the hydrochloric acid, does not call for the administration of this acid unless the gastric glands are certainly destroyed. Milk is prohibited; meat must be used with great care, and only when finely divided. The starchy vegetables should constitute the bulk of the food, but always finely divided. All condiments are useful, and for fluids light white wines mixed with stimulating mineral waters, as Condillac, Pougues, or Soultzmatt. Good red wines, particularly old Bourgogne, are well borne when they produce a favorable stimulation. Of the drugs, bitter tonics, potassium salts, sodium bicarbonate, which stimulate the stomach functions, and small doses of ipecacuanha, which excites the muscular apparatus, are indicated. Various

bitters of complex formulas may be recommended. Patients suffering from this condition are markedly benefited by a sojourn at Vichy, Pougues, Saint-Nectaire, Carlsbad, and Homburg. At one's home the waters of Sautenay and Maizières, which bear transportation, may be used. If intestinal phenomena complicate the gastric, the waters of Châtel-Guyon, Royat, or Kissingen are indicated.—*Bulletin Général de Thérapeutique*, 1896, 4e liv., p. 145; 5e liv., p. 193; 7e liv., p. 289; 8e liv., p. 337; 9e liv., p. 391.

IMMUNITY IN ASIATIC CHOLERA.

DOTT. G. GALEOTTI has made a study of immunization of guinea-pigs against experimental choleraic peritonitis in order to discover the substance either in a culture of the bacilli or in the blood-serum of an animal strongly vaccinated against this micro-organism. From the culture were extracted (1) divers albumins; (2) a peptone; (3) a nucleo-proteid, which is probably a constituent of the bacterial cell. No substance extracted from the culture by alcohol, ether, or chloroform showed any value for vaccination. From the serum of vaccinated animals were separately isolated globulin, resins, fibrin, and a proteid substance of undetermined origin capable of dialysis. All these substances showed strong vaccinal properties. As to how these substances act this much can be said: They do not possess either a bactericidal or antitoxic power, but are capable of stimulating in a living guinea-pig a bactericidal power of an unknown nature, which the animal normally does not possess.—*La Settimana Medica*, 1896, No. 19, p. 239.

THE USE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA IN PRIVATE PRACTICE.

The report of the American Pædiatric Society based upon its collective investigation presents for analysis the results in 3384 cases which occurred in the practice of 613 physicians. In addition two series of cases, one treated in the tenements of New York and the other a partial report from the inspectors of the Health Department of Chicago, are included. The report may be summarized as follows: More than six hundred of these physicians have pronounced themselves as strongly in favor of the serum-treatment. The localities from which reports have been received are so widely separated that no peculiarity of local conditions can account for the favorable record. Doubtful cases which have recovered have been excluded, while doubtful cases which were fatal have been included. No new cases of sudden death immediately after injection have been returned. The number of cases injected reasonably early, in which the serum did not appear to influence favorably the progress of the disease, was but nineteen; nine of these were of doubtful diagnosis, four cases complicated measles, three were malignant, and in two the serum was of uncertain strength and of doubtful value. In three cases the patients appeared to have been made worse; of these, in but one may the result be fairly attributed to the injection. The general mortality was 12.3 per cent.; excluding the cases moribund at the time of the injection or dying within twenty-four hours, it was 8.8 per cent. The most striking improvement was seen in the cases injected during the first three

days; here the mortality was 7.3 per cent.—excluding cases as above, 4.8 per cent. The mortality of cases injected on or after the fourth day was 27 per cent. Of the laryngeal cases (membranous croup) one-half recovered without operation; in a large proportion of cases the symptoms of stenosis were severe. Of the cases upon which intubation was performed the mortality was 25.9 per cent., or less than one-half as great as has ever been reported under any other method of treatment. Broncho-pneumonia occurred in 5.9 per cent. In contrast to the two or three instances in which the serum is believed to have acted unfavorably upon the heart may be cited a large number in which there was distinct improvement in its action after the serum was injected. There is little if any evidence to show that nephritis was caused in any case by the injection of serum. The effect upon the nervous system is less marked than upon any other part of the body, paralytic *sequelae* being recorded in 9.7 per cent. of the cases. The most concentrated strength of an absolutely reliable preparation should be administered as early as possible on a clinical diagnosis, not waiting for a bacteriological culture. However late the first observation is made, an injection should be given unless the progress of the case is favorable and satisfactory. The dosage for a child over two years old should be, in all laryngeal cases with stenosis and in all other severe cases, 1500 to 2000 units for the first injection, to be repeated in from eighteen to twenty-four hours if there is no improvement. A third dose after a similar interval may be necessary. For severe cases in children under two years, and for mild cases over that age, the initial dose should be 1000 units, to be repeated as above if necessary; a second dose is not usually required. The dosage should be always estimated in antitoxin units and not in the amount of serum.—*Pediatrics*, 1896, No. 1, Supplement.

SUDDEN DEATH AFTER A PREVENTIVE INJECTION OF BEHRING'S ANTITOXIN.

DR. R. PALTAUF, noting the previously reported cases of Maizard, Quinon, and Alföldi, claims that these were not definite in that thorough examinations were not made. It is admitted that local and general erythemata, exanthemata, even marked fever, may arise, and occasionally joint-symptoms, but denies that a fatal case has resulted or that permanent injury has been done. The beneficial influence of the serum upon diphtheria is incontestable, and the assumption that death is due to its action only prevents its use through the anxiety, of the laity, to which these reports give rise. Instances of sudden death in children are not uncommon, and may be attributed to causes not found save after especial examination. Among these may be cited acute interstitial myocarditis, the lymphatic-chlorotic constitution of rhachitis.—*Wiener klinische Wochenschrift*, 1896, No. 16, S. 297.

THE TREATMENT OF SCARLET FEVER.

M. E. APERT reports that two attempts in severe cases with the serum of Marmorek (*cf.* THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1896, No. 290, p. 745) were not encouraging. The ordinary treatment is a milk-diet, fifteen to thirty grains of ammonium acetate daily during the period of

eruption, buccal irrigations of aromatic boiled water, and an injection into the nasal cavities of 2 per cent. of menthol in oil.

M. COMBY states that the mortality of this disease treated by injections of Marmorek's serum was 8 per cent., while in the same pavilion the previous mortality was 5 per cent. Not only did the antistreptococcic serum fail to lower the mortality, but it did not prevent the complications due to the streptococcus. One can say that its value is *nil* in the treatment of this disease.—*Journal des Praticiens*, 1896, No. 20, p. 317.

DEATH FOLLOWING ANTIDIPHtheritic SERUM.

M. VARIAT reports a single observation. A child of eighteen months suffered from a slight pharyngeal diphtheria, followed by croup. After intubation five drachms of serum were administered. Death resulted in forty-eight hours; the temperature was 105° F. On necropsy nothing was found to indicate the cause of death. The pharynx and larynx were entirely free from membrane and appeared healthy.—*La Semaine Médicale*, 1896, No. 22, p. 173.

THE CAUSE OF SUDDEN DEATH FROM ANTITOXIN INJECTIONS.

DRS. A. SEIBERT and F. SCHWYZER, from laboratory-experiments, conclude that: (1) Antitoxic serum does not seem to be capable of causing threatening symptoms and speedy death even when brought quickly into the blood-current in very large doses. 2. The carbolic acid used as preservative must be in such a weak solution as to be unable to cause the characteristic carbolic convulsions. 3. Even very small quantities of air will cause severe disturbances and ultimate cessation of breathing, and to this cause the authors attribute the sudden deaths reported.—*New York Medical Record*, 1896, No. 913, p. 708.

TREATMENT OF SNAKE-BITE WITH ANTIVENENE.

DR. FRASER cannot as yet adduce any actual experience of its use in human beings, although a considerable quantity in both the liquid and dry state has been sent to India and Africa. Other remedies, however, should be used which may assist the action of this antidote in preventing death and also by prolonging life increase the opportunity for a more thorough use of it; such would be medicines which increase secretion—diaphoretics and diuretics—rapidly acting stimulants of the circulation, alcohol and the old snake-remedy, ammonia; stimulants of the respiration, atropine and strychnine; the latter of which has received attention. Certain auxiliary measures, as the application of a ligature, removal of the venom by opening up wounds, and suction, are useful. The dose varies with the amount of venom, conditions of administration of the remedy, and time which has elapsed since the bite. The symptoms do not give information as to the quantity of venom received. Probably eleven and one-half ounces would be required surely to antidote the poison if injected not much longer than thirty minutes after the bite had been inflicted; possibly four ounces may be sufficient. The bulk, however, may be reduced one-half by dissolving the dried antivenene. Even with

this substance in its present condition human life may be saved in a considerable, if not in large, proportion of cases of snake-bite which would otherwise terminate in death.—*British Medical Journal*, 1896, No. 1842, p. 957.

A SMALLPOX ANTITOXIN.

DR. S. MONCKTON COPEMAN records the well-known fact that vaccination is practically of no avail when once smallpox has become developed. The recent contributions of Bécclère, Chambon, and Ménard tend to show that the serum of a vaccinated heifer, gathered after the drying of the pustules, immunized to a certain extent against the effects of subsequent vaccination, but the antagonism is by no means complete. Better results might probably be obtained by employing colts instead of calves for production of the serum, since, as Chauveau has shown, an inoculation of colts not infrequently gives rise to a generalized eruption, the effect of which on the system is likely to be more potent than when the reaction, as is the case with calves, is limited to the area of inoculation. If further investigation should be attended with a greater measure of success than has at present been attained, we may hope before long to be in possession of an effectual method for the treatment of those cases in which the system has already become invaded by smallpox, which would form a fitting complement to the Jennerian process of preventive vaccination.—*British Medical Journal*, 1896, No. 1847, p. 1277.

THE USE OF VACCINE VIRUS.

DR. FRANCIS MARTIN uses ivory points, making two sets of scarifications—a half-dozen short lines close together—about two inches apart with a dull bleeding-lancet, cutting just deeply enough through the skin to draw a tinge of serum and blood. These lines are crossed with a similar set of cuts at right-angles. The virus is thoroughly dissolved on the point with a little water, the cuts wiped thoroughly, and it is immediately rubbed into the cuts for ten seconds with the flat side of the point. The arm is exposed to the air for one minute. No plaster or subsequent dressing is necessary. The arm should be washed at bedtime. In three or four days the vesicle will begin to appear, and will be at its height in about eight to nine days, after which it will decline. Unless the crust is broken, there will be no severe symptoms with good virus, and, indeed, there should never be bad and sloughing arms if the patient is in any reasonably healthy condition at the time.—*Medical Record*, 1896, No. 1334, p. 757.

THE ADMINISTRATION OF THYROID GLAND.

DR. H. HUCHARD prefers the administration of the gland in its natural condition to subcutaneous injections of the juice or its extract, because there is no risk of introducing into the syringe septic material, and there is always the assurance that the gland is in a fresh condition. The gland from the sheep should always be used on account of the absence of tuberculosis in this animal. The dose is one lobe, fifteen to twenty grains, in bouillon, slightly fried or raw when cut in small morsels.—*Journal des Praticiens*, 1896, No. 16, p. 242.

MEDICINE.

UNDER THE CHARGE OF
WILLIAM OSLER, M.D.,

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AND

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PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

THE CHANGES IN THE BLOOD IN HÆMOGLOBINURIA.

VACQUEZ and MARCANO report the result of their examination of the blood in a case of the so-called idiopathic hæmoglobinuria. The disease was of the paroxysmal form, and occurred in a young man in whom the only possible assignable cause was malaria, which he had suffered from some years previously. At the time he was under observation he was perfectly free from malaria, and no other organic disease could be made out; the urine, however, contained a small amount of serum-albumin.

The examination of the blood was made before, during, and after a paroxysm.

It was found that six hours after the attack the red corpuscles had diminished 400,000 in number, and twenty-four hours later the count showed a diminution of 1,000,000. The diminution in hæmoglobin was not proportionate with the diminution in red corpuscles, but was considerably greater than would have been expected, and the regeneration of the hæmoglobin was not so rapid as that of the red corpuscles.

The alteration in the appearance of the red corpuscles, already described by Hayem, was observed, viz.: That certain corpuscles had the appearance of losing their color gradually. The white corpuscles showed no special change. The authors state, in conclusion:

1. That hæmoglobinuria is rarely pure; it is generally accompanied by a real destruction of red blood-corpuscles at the moment of the attack.

2. The loss of hæmoglobin greatly surpasses the loss of red corpuscles, as in one case the loss of hæmoglobin equalled one-third of the normal, while the loss of red corpuscles only equalled one-ninth of the normal.

3. The resistance of the blood is much diminished at the time of the attack. On testing by Melassez's method it is found that the red corpuscles destroyed at the end of twenty-four hours during the attack are equivalent to one-third of the total count, while during the normal state not one-quarter of the normal count are destroyed.

4. The so-called paroxysmal hæmoglobinuria being only a symptom, and not a morbid entity, it is important to examine in every case the modifications in the blood in order to find out if different varieties of hæmoglobinuria are associated with different changes in the blood. If this proves to be the case the blood-examination will be of great help in establishing a rational classification of these cases.—*Archives de Médecine Expérimentale*, January, 1896.

GAUCHER'S DISEASE.

Under the heading of primary epithelioma of the spleen PICOU and RAMOND describe a case, of which only one other example is reported, that of Gaucher, whose name has been given to the disease.

The patient was a young woman, aged thirty-two years, and presented the same clinical picture as Gaucher's original case, the main points of which are as follows:

The disease comes on in an insidious manner, with enlargement of the spleen, accompanied by dull pain in the left hypochondriac region. The hypertrophy of the spleen is accompanied by an increase in the size of the liver, and almost the entire abdomen may be filled by these viscera at an early date. There is no ascites. The hypertrophy of the organs is smooth and regular.

The functional symptoms are the pain above mentioned and also symptoms due to compression, dyspepsia, constipation, dyspnœa, frequent urination, œdema, and at times cramps of the lower limbs.

Hemorrhages are one of the most marked features of the disease; they take the form of epistaxis, subcutaneous hemorrhages, etc. The gums become soft and spongy, like those of scorbutus. Slight icterus may occur. Two symptoms upon which Gaucher lays particular stress are the complete absence of glandular enlargement and anæmia without leukæmia. The duration of the disease is protracted.

The main anatomical lesions consist in the hypertrophy of the spleen and liver. Both organs retain their original shape, and their surfaces remain smooth.

The color of the spleen is described as violet, paler than normal. The splenic parenchyma is sclerosed, and the trabeculæ of the organ are much thickened.

Microscopic sections of the spleen show that its proper substance is destroyed, and its place taken by alveoli, formed of the thickened trabeculæ, filled with large cells with sharply defined nuclei. The liver presents the macroscopical lesions of cirrhosis, the increase in connective-tissue being both peri- and intra-lobular.

According to Picou and Ramond, the tumor of the spleen resembles somewhat endothelioma, but they were unable to trace an endothelial origin in their case, and so are inclined to regard it as a carcinoma.—*Archives de Médecine Expérimentale*, March, 1896.

TETRAGENUS SEPTICÆMIA.

In a recent article CHAUFFARD and RAMOND report two interesting cases of septicæmia occurring in human beings due to the micrococcus tetragenus of Gaffky.

The organism has been described before as a cause of local infection and as a frequent inhabitant of phthisical cavities, but these are the first reported cases, the authors think, of general infection due to it.

The first case was that of a girl, aged fifteen years, in whom, following la grippe, a polyarthritis appeared, attacking the hips, knee, thumb, shoulder,

and elbow-joints, and accompanied by chills, an erythematous skin eruption, and great dyspnœa. The patient died on the eleventh day from the onset of the disease. The second case was that of a young man who was taken with chills, nausea, and headache, followed by great swelling of the right knee-joint. This was followed later by extensive infiltration of the right hip and leg, and enlargement of the inguinal glands. On the tongue was an ulceration, opposite to a carious tooth containing a cavity. The patient died in spite of operative interference ten days from the onset of the disease. In the first case the right knee was aspirated during life and eight centimetres of a chocolate-colored pus, containing numerous oil-drops, were evacuated.

At the autopsy the lesions of a general infection were present. There were pericarditis and pleuritis, the pericardium and pleura containing fluid, on the surface of which floated many oil-drops. In the wall of the left ventricle were foci of purulent myocarditis with abscess-formation, and in one segment of the tricuspid valve was a small, round ulcer of one centimetre in diameter and unaccompanied by any vegetative process. The lungs showed one or two infarcts. All of the organs contained abscesses whose contents had a caseo-fatty appearance.

In the second case no autopsy was obtained, but cultures were made during life from the ulcer of the tongue, the cavity in the tooth, and from the infected knee.

In the first case cultures from all the organs with the exception of those from the lung gave a pure growth of an organism which corresponded in every way to the micrococcus tetragenus of Gaffky. In the lung infarct the colon-bacillus was also present.

In the second case the tetragenus was present in large numbers in the cultures from the carious tooth and the tongue ulcer, and in pure culture from the knee-joint.

The organism from each case was pathogenic for animals, and the oily appearance of the pus was noted in them as in the original cases.

The authors conclude that the tetragenus is capable of causing general infections in man, as had been previously suspected from its pathogenicity in animals.—*Archives de Médecine Expérimentale*, May, 1896.

HEMORRHAGIC MYXŒDEMA WITH CONTRACTURES.

Under the title of "Myxodermie Contracturante Hemorrhagique," DE BRUN has recently described what he considers to be a new disease, which is characterized by the following phenomena:

The onset is sudden, with high fever, malaise, vomiting, headache, and the rapid appearance of typhoid phenomena, with great agitation at night. The delirium is often violent. The temperature-curve divides itself into three periods:

1. Rapid rise of the temperature to 39° C., the temperature remaining between 39° C. and 40° C. for from eight to ten days.
2. Pyrexia or even hypothermy for eight days.
3. The temperature again rises to 39° C.

During the disease there is a general contracture of the muscles, especially those of the face and neck and the muscles of mastication. The skin becomes

"malleable" like soft wax, and subcutaneous hemorrhages in the form of ecchymoses, surrounded by a white, painful zone, appear in the third period of the disease.

There is absence of meteorism and rose spots.

The disease lasts from three to four months. The prognosis is grave. The cause has not yet been discovered.—*La Presse Médicale*, May 13, 1896.

PERICARDITIC PSEUDO-CIRRHOSIS OF THE LIVER.

F. PICK (*Zeitschrift für klin. med.*, Bd. xxix. p. 385) publishes an interesting article, the substance of which he gives in the following conclusions :

1. There are cases resembling precisely the mixed form of cirrhosis of the liver, with enlargement of the liver and marked ascites, but without jaundice, which are due to a latent pericarditis. This causes disturbances in the circulation of the liver which lead to connective-tissue overgrowth and to most intense ascites through congestion of the portal circulation.

2. This occurs especially in early life, but may also be observed in old age.

3. In the differential diagnosis the following points are important: The absence of an etiological factor for cirrhosis, a history of pericarditis, and a previous œdema of the legs. An accurate result can only be obtained through a complete examination of the heart.

THE ETIOLOGY OF SEROUS PLEURISY.

ASCHOFF has analyzed the cases of pleurisy in Albert Fraenkel's wards, and has made a useful contribution to our knowledge of that subject.

Two hundred cases were examined with reference to the questions: Is there an "idiopathic," non-tuberculous, serous pleurisy? Is there an acute rheumatic pleurisy, equivalent to a previous acute arthritis? Are there serous exudates, with pyogenic organisms, which do not become purulent?

The exudates were examined by inoculating three agar-tubes each with three large drops and keeping the tubes at 37° C. Fresh and stained preparations of the fluid were also examined. In twenty cases intraperitoneal inoculations were made in white mice. Forty-three of the 200 cases were demonstrated to be tuberculous by finding bacilli in the sputum or other products. Nineteen more had the suspicion of tuberculosis in the history. Of the 200 cases only seven gave a positive result when examined for bacteria. Out of seventeen inoculations only two, belonging to the seven just mentioned, gave positive results. These were a case of sepsis and one of tuberculosis. The others were: metapneumonic, 2; so-called idiopathic, 2; one of each showing streptococci and one pneumococci; one following gangrene of the lung with streptococci. The first two patients died. In the other five the exudates became purulent ultimately. Operation is not always necessary in such cases. Some recover spontaneously, so that recovery in case of pleurisy does not prove a non-purulent exudate. In all the rest of the 193 cases bacteriological examination was negative. The author answers the possible criticism that his negative results were due to the small amount of exudate used. Perhaps a more pertinent objection, not mentioned, is that anaërobic cultures should have been made. The most interesting cases were

those in which there was demonstrable or suspected tuberculosis, and the so-called idiopathic cases. Of thirteen belonging to the first class, inoculations in guinea-pigs gave positive results in seven. Of inoculations in twelve suspected cases, three were negative. A similar proportion was observed in the so-called idiopathic cases, nine out of twelve causing tuberculosis in guinea-pigs. This confirms the view that most cases of idiopathic pleurisy are tuberculous. That such cases may recover completely is emphasized by the author. Aschoff thinks it very doubtful whether rheumatic pleurisy ever occurs without the joints or the heart being also affected. In the sixteen cases observed by him a complication on the part of the heart was not missed once. As regards the question of serous exudate and pyogenic bacteria, the author draws the conclusion that such exudates are almost always free from bacteria. If pyogenic organisms are present, suppuration is likely to occur sooner or later. This is not so often the case when pneumococci are present, probably by reason of the early death of those organisms. The author holds that the spontaneous recovery of serous pleurisy is not uncommon, and that salicylic acid has no advantage in its treatment.—*Zeitschrift für klin. Med.*, Bd. xxix. p. 440.

GASTROSCOPY.

PERL (*Zeitschrift für klin. Med.*, Bd. xxix. p. 494) has made some observations which throw much light on the difficult subject of gastroscopy. The position and shape of the cardia were learned by making plaster-of-Paris casts. These show that the subphrenic part of the œsophagus is more fixed than the thoracic part, and that its direction is usually toward the left. The cardia was usually found at the level of the twelfth dorsal vertebra. The average length from the incisors to the cardia was found to be 60 cm. In passing metallic sounds of 12 mm. diameter the instrument is introduced at the right angle of the mouth, by which the difficulty presented by the turn to the left in the lower part is overcome. Out of twenty-three men only three failures were met with; out of ten women only one—a much more favorable showing than most investigators have been able to make. In some cases the passage of the instrument is hindered by a spasm of the œsophagus, usually of neurasthenic origin. A natural difficulty is presented by short and thickset persons, in whom the passage of an œsophageal sound may be impossible. Other obstacles are exudates, tumors of the liver or stomach, and curvature of the spine.

THE DIAGNOSIS OF CYSTICERCUS IN THE BRAIN.

MORITZ (*St. Petersburger med. Wochenschrift*, 1896, No. 10) had a case in which the diagnosis of benign tumor in the posterior fossa was made during life. Autopsy showed a cysticercus cyst as large as a hen's-egg. From a study of other reported cases, some of them closely resembling his own, Moritz draws the following conclusions as to the diagnosis of cysticercus in the brain when there are no external cysts:

1. There are signs of a severe afebrile, non-inflammatory disease of the brain, the chief symptoms being irritative.
2. Paretic symptoms speak against cysticercus, except in the last stage.

3. Choked disk is always present.

4. The exclusion of other brain-tumors is only possible by continued observation. Malignant new growths have a more uniform course. Gliomata sometimes show periods of improvement, but usually have more severe symptoms than has cysticercus. Isolated tubercles, which occur especially in the cerebellum, also have a protracted course, but with them pain, headache, and dizziness are more constant. Slowly growing cysticerci cause irregular exacerbations of convulsions, headache, and dizziness, alternating with periods of comparative comfort, the latter sometimes lasting weeks or months.

5. Death usually occurs in convulsion.

Abstracts of all the available cases are appended to this paper.

SIMULATED PAROXYSMAL HÆMOGLOBINURIA.

RICHTER reports the case of a man, who, having had an extensive experience in hospitals, endeavored to simulate paroxysmal hæmoglobinuria. His urine contained blood, leucocytes, and detritus. The temperature rose to 42.2° C. As the patient had previously simulated hæmoptysis, and as he did not feel hot to the touch, notwithstanding the high temperature, and as his intellect was clear, the urine-glass was carefully watched and the temperature taken in the rectum. From that time the man remained free from symptoms.—*Prager med. Wochenschrift*, 1895, No. 35.

THYROIDIN.

BAUMANN furnishes some interesting additions to our knowledge of this substance (*Münchener med. Wochenschrift*, 1896, No. 14; see THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, May, 1896, p. 597).

The greater part of thyroiodin occurs in the gland in combination with two albuminous bodies, an albumin and a globulin, especially the former. The effect of thyroiodin on parenchymatous goitres, myxœdema, and obesity was found to be precisely like that of the gland itself. Observations on metabolism in men and animals gave the same results, and finally accidental intoxication from overdoses also showed the new substance to represent the characteristic constituents of thyroid gland. Experiments show that the action of thyroiodin is more prompt than that of the gland, which may be explained by the fact that it must be liberated from the gland by digestion.

A very interesting fact brought out by Baumann is that the amount of iodine in the thyroid is much greater in normal than in goitrous glands, and greater in non-goitrous than in goitrous localities. So in Freiburg, where goitre is common, the average amount of iodine in the thyroids of adults was found to be 2 mg., whereas in glands from Hamburg, though only half as large as the former, the average was 3½ mg. In children the difference was still greater. Disease other than goitre did not seem to affect the amount of iodine, which was not greater in the thyroid of suicides than in persons dying of various diseases. In early life and old age the amount is relatively small; greatest between twenty-five and fifty-five years. The kind of food, especially the use of sea-fish, has a marked effect on the amount of iodine in the gland.

Whether there is less iodine in the soil and water in goitre-districts is not known.

Later experiments have shown Baumann that the thymus (of calves) contains a small amount of iodine, an important fact in connection with the other, that the use of thymus in some cases of goitre has been followed by a diminution in the size of the gland. The use of iodine or iodoform causes an increase in the amount of iodine in the thyroid, sometimes as much as 20 to 30 mg. In the thyroid of a large dog, whose abdomen was repeatedly rubbed with iodoform, 48 mg. were found.

CROUPOUS PNEUMONIA AS A FATAL COMPLICATION OF DIABETES. SUGAR IN THE SPUTUM.

BUSSENIUS reports from Senator's clinic (*Berliner klin. Wochenschrift*, 1896, No. 14) the case of a woman, aged fifty years, who was found to be diabetic in February, 1895, was taken with pneumonia in November, and died on the eleventh day. On admission to the hospital the urine was found to contain glucose to the amount of 4.2 per cent. Sugar was present to the end, varying in relative and total amount, but increasing with the final crisis and falling just before death. The sputum contained one-fourth of 1 per cent. of sugar. This was said by Biermer to be a normal constituent of sputum, a statement afterward abandoned. From observations made by Bussenius, the latter thinks the small quantities of sugar occasionally found in the sputum of non-diabetics may be due to accidental contamination from food. The comparative rarity of pneumonia in diabetes appears from the experience of Senator, who, out of nearly 700 cases of diabetes, saw only seven cases of pneumonia, not counting one case of broncho-pneumonia and five of influenza-pneumonia. In none of these cases did the sugar disappear during the febrile period, though in one case it fell from 3.55 to 1.78 per cent. The prognosis is always unfavorable. It is impossible to say whether death is due to the pneumonia or to coma.

SYMMETRICAL GANGRENE—DEATH FROM APOPLEXY—ARTERIOSCLEROSIS.

THIERSCH (*Münchener med. Wochenschrift*, 1895, No. 48) reports the case of a man, aged thirty-five years, who for ten years had symmetrical gangrene, beginning in the toes. Later, the skin over the feet became livid and discolored. Death took place with symptoms of apoplexy. Autopsy showed hemorrhage in the left lateral ventricle and extensive and severe arteriosclerosis. The arteries of the legs were especially affected.

GLIOSIS IN EPILEPSY.

BLEULER (*Münchener med. Wochenschrift*, 1895, No. 33) has found an increase of the neuroglia-fibres in all of twenty-six cases of epilepsy. The hypertrophy occupies a position between the pia and the external tangential nerve-fibres. All the patients had had severe epileptic imbecility. Control-examinations of fifty-four brains, fifty-one from cases of insanity, three from persons free from mental symptoms, did not disclose a similar condition.

The histological picture was so striking that the sections from epileptic cases could easily be recognized. The author does not attempt to prove that the gliosis is the cause of the epilepsy, but believes it probable that the change is at least simultaneous, as it is not more marked in cases of long duration than in recent ones.

TWO CASES OF CEREBRAL SPASTIC DIPLEGIA.

OPPENHEIM observed this in a mother, aged thirty-one years, and her daughter, ten years. Ever since her childhood, perhaps from birth, the mother had motor disturbances in the muscles of the body, extremities, face, tongue, palate, pharynx, and larynx. The condition was one of paresis or paralysis, with spasms and athetosis. The intellect was well preserved, but the patient was perfectly dumb. The motions of crying and laughing were preserved. The expression was somewhat drawn; trismus was permanent; the muscles of the face moved with difficulty or sometimes involuntarily; motion of the tongue was difficult. There were distinct athetosis of the hands and spastic paralysis of the feet.

The daughter was able to speak only for the last year, and then with difficulty, but otherwise was in much the same condition as the mother. The spastic condition of the legs was not so marked, but there were the same facial expression, trismus, and difficulty of swallowing and chewing.—*Berliner klin. Wochenschrift*, 1895, No. 34.

CEREBRAL HEMORRHAGE IN WHOOPING-COUGH.

OPPENHEIM reports the following rare case: A lad of eight years suddenly became unconscious while sick with whooping-cough. At first there were no local symptoms. Later, the previous agitation subsided, complete somnolence followed. Gradually spasms began in the right side of the face, and extended over the whole right side. The convulsions came on in paroxysms, following closely after attacks of coughing. After three days the attacks became less frequent and severe. Paralysis of the right arm and leg, with absent reflexes on that side, then developed. On the sixth day the intellect began to clear up, though aphasia persisted until the tenth day. By the end of three weeks recovery was complete.

It appeared that the boy was in the habit of closing the mouth and nose at the beginning of a coughing-paroxysm, and to make strong expiratory efforts, in order to check the cough. It can hardly be doubted that this assisted in the production of a hemorrhage in the left hemisphere, as Oppenheim supposed.—*Deutsche med. Wochenschrift*, 1896, No. 17.

DIPHTHERIA AND ANTITOXIN.

The Metropolitan Asylums Board of London has recently issued a statistical report on the use of antitoxin in diphtheria, as observed in six fever hospitals during 1895.

The statistics are based on a comparison with cases treated during 1894, when no antitoxin was used, this year being chosen on account of the fact that the mortality was exceptionally low at that time.

The tables show a general decrease in mortality of 7.1 per cent. in favor of 1895. The reduction is more striking if age and the day of the disease on which the antitoxin was administered are taken into account.

In the first quinquennium of life the results are most striking, and here the mortality is reduced 13.2 per cent. in 1895, lower than it was in 1894.

The necessity of administering the antitoxin early is forcibly shown by the statistics bearing on the relation between date of administration and mortality, as it is shown that those cases in which the antitoxin was administered on the first and second days show a mortality of 4.6 per cent. and 14.8 per cent., respectively, in 1895, as against 22.5 per cent. and 14.8 per cent. in 1894.

The mortality in laryngeal cases is also shown to be greatly reduced, the percentage in 1895 being 49.3 as compared to 70.4 in 1894.

The complications of the disease were apparently not influenced by the antitoxin, as cases showing complications were rather more numerous in 1895 than in 1894. That this was not due to the antitoxin is shown by comparing an equal number of cases in 1894 and 1895 not treated by antitoxin, when it is seen that the 1895 cases show a higher percentage of complications.

The authors summarize the results of their inquiry in the following conclusions :

1. There is a great reduction in the mortality of cases brought under the antitoxin treatment on the first and second days of the disease.
2. That in this series of hospitals the combined general mortality is below that of any other year.
3. That there is a particularly remarkable lowering of mortality in the laryngeal cases.
4. That there is a uniform improvement in tracheotomy results.
5. That there is a beneficial effect produced upon the clinical course of the disease.

They consider the value of the antitoxin to be demonstrated from the study of this large number (2182) of cases ; and lay particular stress upon beginning the treatment as early as possible.—*Metropolitan Asylums Board. Report of the Medical Superintendents upon the Use of Antitoxic Serum in Diphtheria.* London, 1896.

URÆMIC APHASIA.

At a recent meeting of the Hospital Medical Society of Paris RENDU gave the history of a patient presenting this interesting condition.

The patient was a man of fifty-six years, and was admitted to the hospital with the history of having suddenly been seized with an apoplectic attack. The morning following admission he had regained consciousness, and his three main symptoms were aphasia, monoplegia of the right arm, and a systolic murmur at the base of the heart.

— From these signs a diagnosis of cerebral embolism was made. Some days later the patient was seized with a sudden attack of intense dyspnœa, with Cheyne-Stokes breathing ; the urine was scant and very albuminous, and the blood contained seventy-five centigrammes of urea to the litre. The diagnosis was then made of uræmic poisoning.

The patient was bled immediately, and recovered in a day or two, both the monoplegia and the aphasia entirely disappearing.

Rendu regarded the aphasia and partial paralysis as both being due to uræmic intoxication, and in the discussion Hanot expressed the opinion that the similar lesions which may take place in pneumonia and other infectious diseases were also toxic. Duflocq mentioned a case of aphasia occurring in the course of cholera, in which the autopsy showed no lesion whatever.—*Gazette Médicale de Paris*, April 4, 1896.

THE MOBILITY OF ABDOMINAL TUMORS.

NOTHNAGEL (*Festschrift zur 100 Jahr. Stiftungsfeier des Med.-Chir. Friedrich Wilhelms-Institutes*) in this article considers the mobility of abdominal tumors under four principal causes: Respiratory, or the motion of the diaphragm; the peristaltic motion of the stomach and intestines; external pressure; gravity.

1. All organs immediately beneath the diaphragm descend in inspiration and ascend in expiration. Diagnostic errors due to the inspiratory distention of the abdominal wall can only be avoided by experience. In the differential diagnosis of tumors of the liver and stomach the possibility of retaining the tumors in expiration is in favor of the stomach. Respiratory motions may be absent on account of pleurisy, emphysema, or adhesions, or in enormous enlargement of the liver or spleen, by which the contraction of the diaphragm is limited. The mobility of renal tumors, though slight, is important as contrasted with that of retroperitoneal neoplasms.

2. Tumors of the stomach and intestine may be moved by the peristaltic action of those organs, but the temporary disappearance of a tumor does not permit the conclusion that the growth is in the stomach or intestine. Peristaltic motion is usually limited, although sometimes it causes a considerable excursion.

3. Dislocated organs, such as the liver, spleen, and kidney, are easily moved by palpation unless adhesions have formed. Intestinal tumors are usually very movable, a fact of great importance in distinguishing between these and paratyphlitic exudates. Tumors of the stomach, especially the pylorus, have great passive mobility, but are not much influenced by respiration. Tumors of the gall-bladder, omentum, ovaries, and uterus are slightly movable, but abscess, circumscribed exudates, aneurisms, pancreatic tumors, tumors of the retroperitoneal glands, bones, and undescended testes are immovable.

4. Gravity influences especially tumors of the stomach and intestine.

HEPATIC NEURALGIA.

PARISER, in the Congress for Internal Medicine (*Centralblatt für innere Med.*, 1896, No. 17, p. 467), reported seven cases of nervous hepatic colic. This is usually mistaken for gallstone colic, and in one case of the author's an operation was performed under the erroneous idea. The clinical picture is usually precisely like that of colic from calculus. Fürbringer thinks that in hepatic neuralgia the most intense pain is localized in the liver, and is not radiating, and although this is true in many cases, exceptions occur. The attacks last from a few minutes to four or more hours. As in biliary colic, the attack may end in vomiting. The disease is a visceral neurosis, with a neurasthenic or hysterical basis. The most successful treatment consisted in the use of tonics, the exclusion of exciting causes, and cannabis indica.

FIBRINOUS BRONCHITIS.

SOKOLOWSKI (*Deutsches Archiv für klin. Med.*, Bd. lvi. p. 476) reports four cases of this uncommon disease, on which he was able to make some interesting observations. One case was remarkable for its long and steady course, without fever, with daily expectoration of bronchial casts and blood. The patient died of exhaustion, after four years. Physical examination, as well as repeated examinations of the sputum, gave no evidence of tuberculosis. There was never elastic tissue in the sputum. The author believes that the cases of so-called primary fibrinous bronchitis, in which tuberculosis was found post mortem, have really been cases of tuberculosis with the peculiar form of bronchitis as a complication. In another case the patient had all the symptoms of a severe septic infection, with chills, fever, and sweats, for more than three weeks. These symptoms led to a careful examination of the sputum, which contained staphylococcus albus and aureus. There seemed to be ground for believing the patient, a physician, was infected in the pathological laboratory. Staphylococci were also found in the sputum of a third case, in which the course was acute, began with chills and fever, and resembled influenza. In the sputum large numbers of Charcot's crystals and Curschmann's spirals were found. A similar case was reported by Zenker in 1876, and some after that by others, and from these the author draws the conclusion that fibrinous bronchitis and bronchial asthma have a close relationship.

The casts expectorated were found to be made up of leucocytes, mucus, and epithelial cells, with a small amount of fibrin. Many of the cells were in a condition of coagulation-necrosis.

Sokolowski formulates his views on the disease as follows:

1. Acute fibrinous bronchitis has the type of a pure infection, and is possibly due essentially to staphylococci (albus and aureus). Typical acute cases are rare, the milder forms being more frequent, and the latter are probably often overlooked or mistaken for asthma.
2. Chronic fibrinous bronchitis is an obscure process, with a different etiology, but included with the acute disease on account of the occurrence of the casts. The latter, however, may occur in other chronic diseases (tuberculosis, heart-disease).
3. Pulmonary tuberculosis appears to play only a subordinate rôle in the etiology of chronic fibrinous bronchitis.

THE PERCUSSION OF THE HEART WITH THE BODY INCLINED FORWARD.

GUMPRECHT (*Deutsches Archiv für klin. Med.*, Bd. lvii. p. 490), who has made an extensive series of observations, gives this subject a more important place in diagnosis than it has had hitherto. The most convenient position is to have the patient on the hands and knees, though the examination can be made with the patient standing, leaning forward, or sitting in a chair placed on a table. In this position the boundaries of the normal heart-dulness are the left edge of the sternum, the fourth rib, the left nipple-line, or as much as one and one-half cm. beyond it. The width of the heart-dulness as compared with the circumference of the thorax is as one to eight,

The greater the fraction the greater is the probability that the heart is enlarged. Of the advantages of the method the chief one is that the result is more easily obtained than by other methods. This depends partly on the fact that the heart-dulness is larger than when percussed in the ordinary position; partly on the fact that the layer of lung over the heart is thinner, so that the difference in sound is more intense. The sense of resistance is also increased. In fact, in many cases the cardiac dulness is first discovered when this method is used, especially in cases with great tympanites. Unfortunately, the condition of the right heart is not much more easily demonstrated by this method than by others. Absolute dulness to the right of the sternum is not very frequently found, so that for the demonstration of hypertrophy of the right ventricle the accentuation of the pulmonary second sound must still be used. In cases with hypertrophy of the left ventricle, such as that in arteriosclerosis, nephritis, etc., the new method gives brilliant results, an increase of four to six cm. in width being not uncommon, and even greater widths being found. Gumprecht has not yet encountered a case in which emphysema prevented the detection of enlargement, both dulness and resistance being very marked and easily recognized. Effusions in the pleura, especially the right, render the method difficult and uncertain.

RESPIRATORY NEUROSES; SPANOPNŒA AND TACHYPNŒA.

STRUBING (*Zeitschrift für klin. Med.*, Bd. xxx. H. 1 and 2) describes some rare respiratory neuroses. In two cases there were attacks of slow and deep breathing. In one case this amounted to orthopnœa, with subjective dyspnœa and feeling of anxiety. Strubing gives this condition the name of spanopnœa. He looks on it as an inhibitory neurosis. In one case the attacks seemed to be due to irritation of the respiratory inhibitory fibres of the superior laryngeal nerve in swallowing. In another it appeared as an asthma from irritation of the trigeminal fibres in chronic rhinitis and hypertrophy of the turbinated.

Tachypnœa also comes on in paroxysms, with increase of the frequency and diminished depth of the respirations. Two cases were seen. In one the attacks ceased after the restoration of a retroflexed uterus. In the other case there were nervousness and mental deficiency.

THE THORACIC ORGANS IN CHLOROSIS.

F. MÜLLER (*Berliner klin. Wochenschrift*, 1895, No. 38) calls attention to the fact that in chlorosis the diaphragm is abnormally high, so that the percussion is much like that in children. The fact that in chlorosis the cardiac dulness is enlarged has been variously explained. Müller has noticed that in recovery from chlorosis the diaphragm and the heart-dulness return to the normal, the cardiac dulness to the right of the sternum being the first abnormality to disappear. As a hypertrophy of the heart can hardly be supposed to exist in these cases, and as the shape of the heart opposes the idea of dilatation, Müller assumes that the enlarged heart-dulness is due to incomplete expansion of the lungs. This would also explain the high position of the diaphragm.

OPHTHALMOLOGY.

UNDER THE CHARGE OFGEORGE A. BERRY, M.B., F.R.C.S. EDIN.,
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OPTIC NERVE ATROPHY IN THREE BROTHERS.

F. N. OGILVIE reported at the January meeting of the Ophthalmological Society of the United Kingdom the cases of three brothers, aged twenty-four, twenty-two, and twenty-seven years. In the first the sight was said to have failed in one night, in the second in three months, and in the third in six months. They had all been smokers, but one had given it up more than seven years before. In all of them there was a central scotoma, in two defective color-vision, and in only one were the fields for white contracted. The ophthalmoscopic changes were not well marked. In two of the brothers there was pallor of the disk, but the atrophy was not of very high degree in any of them. Vision was much reduced. One had improved somewhat under strychnine and galvanism. A peculiarity which they shared with other members of their family was tortuosity of the retinal vessels. So far as the family history could be traced there were no other cases of optic atrophy.

RECURRENT OCULOMOTOR PALSY.

G. E. DE SCHWEINITZ (Philadelphia) reports (*Trans. of the Amer. Ophthalm. Soc.*, vol. vii. page 309) the case of a woman, aged thirty years, who, when one and one-half years old, was violently ill with vomiting, convulsions, right divergent strabismus, and ptosis. At the end of six weeks ptosis and divergence disappeared. From that time she had frequent attacks of neuralgia, mostly associated with divergence of the right eye and closure of the lids; occasionally the ocular symptoms were absent. During childhood these attacks occurred as often as three times a week; later there had not been over five or six in a year. When four years old the divergence became more or less permanent. Two years ago, after an unusually severe attack, ptosis also became permanent. The attacks were preceded by dizziness and full feeling of the head, swelling of the periorbital tissues, and distention of the cutaneous veins. Pain began in the right eye and extended to the occiput, where it settled. Following the onset of pain there was vomiting, lasting from twelve to twenty-four hours. The pupil was oval and absolutely fixed; vision 6/60; the left eye was normal. Treatment by mercury, iodides, and strychnine produced no result.

In a case exhibited by Dr. Ormerod and Mr. Holmes Spicer at the December meeting of the Ophthalmological Society of the United Kingdom, the

boy, then aged fifteen years, was first attacked when one year old, but the second attack did not occur until the age of seven, since which time an attack came every nine or ten months. The left eye was affected, and an intense headache occurred on that side. There were slight ptosis, dilated pupil, and complete paralysis of the external muscles supplied by the third nerve.

SUPERNUMERARY CARUNCLE.

SIDNEY STEPHENSON (London) reports (*Ophthal. Review*, No. 171) this condition occurring in a girl, aged eleven years. It presented on the right lower lid as a small reddish growth, oval, about as large as a hemp-seed, with a granular surface, lying behind the inferior canaliculus; but was not connected with the caruncle. No change was observed in it during six months she was under observation. It was then snipped away; and, examined microscopically, was found to consist of epidermic and dermic tissue, the latter containing hair follicles, sebaceous glands, and muscular fibres. He had been unable to find any case previously reported.

EYE-LESIONS IN MYXŒDEMA.

P. A. CALLAN (New York), discussing the ocular conditions presented by patients with this disease, states (*Trans. of the Amer. Ophthal. Soc.*, vol. vii. page 391) that the prominent symptoms are lacrymation, due to the swelling of the lids, and an appreciable amount of corneal anæsthesia.

Referring to the statement of Hamilton, "that the fundus oculi presents a peculiar tumefied appearance and choked disk is occasionally found," he says that in four cases repeatedly observed there were no such lesions. One of his patients, after treatment for two years with thyroid extract, had developed a typical albuminuric retinitis.

DETACHMENT OF THE RETINA.

R. B. DUNCAN (Melbourne) concludes, with reference to retinal detachment (*Australian Medical Journal*, vol. xvii. No. 12), that it is impossible for it to occur in a perfectly healthy eye. Disease of the retina itself, as a rule, precedes any detachment. Vitreous changes in the form of fibrillary alterations, with or without retraction, are invariably present, and are generally antecedent to the retinal changes and detachment. In idiopathic cases the retraction of the vitreous is the primary cause of the retinal detachment. In traumatic cases, while the retinal detachment may suddenly occur, it is only possible when some anterior changes have occurred in the vitreous. Retinal ruptures are common to the great majority of retinal detachments.

TREATMENT OF ULCERS OF THE CORNEA.

E. W. WOOD WHITE, in the Middlemore lecture (*Birmingham Medical Review*, vol. xxix. No. 1), deals chiefly with the treatment of ulcers of the cornea. He thinks the protective bandage should generally be adopted to prevent irritation of the surface; but that it is contraindicated where there

is considerable conjunctival discharge and irritation, in sloughing ulcers secondary to lacrymal disease, and in young children. After corneal perforation he would use the pressure-bandage. Mydriatics are of great assistance in a large proportion of cases. For painful superficial ulcers he prefers the mydriatic dissolved in vaseline or castor oil, rather than water. Of drugs of this class he has found the hydrochlorate of scopolamin most satisfactory.

If the ulcer is extending, more active treatment is necessary. For this, he says, "the galvano-cautery has been universally used with splendid results." It is not necessary to cauterize the whole ulcer, but the advancing margin must be thoroughly destroyed. After cauterization he fills the ulcer with finely powdered iodoform or iodol. Scraping the ulcer, the dropping upon it of water heated to 150° and daily applications of carbolic acid, formalin, or a saturated solution of mercuric chloride, are mentioned. He believes that only in rare instances is eserine the best drug to use, and that it had better be avoided by those whose experience is not large. For rapidly spreading ulcers with hypopyon, paracentesis of the cornea, with or without the entire removal of pus from the anterior chamber, or the Saemisch incision, may be resorted to.

Regarding subconjunctival injections, he finds weak solutions of mercuric chloride, 1 to 4000, less painful than strong solutions and equally effective, but that probably the best agent for this use is a 4 per cent. solution of common salt.

The branching ulcer of so-called dendriform keratitis generally requires touching with the cautery or scraping. The absorption or faceted ulcer demands tonics and nourishing food; so does keratomalacia.

NON-EXISTENCE OF A SEPARATE CORTICAL COLOR-CENTRE.

WARD A. HOLDEN (New York) (*Archives of Ophthalmology*, vol. xxiv. No. 4) opposes the view that color-perception is connected with a cortical centre distinct from that for the perception of form, by a series of observations made on cases of hemichromatopsia. He had one-centimetre squares of pale green, saturated red, and saturated blue placed on gray, cards having the same light-intensity as the colors. Three gray patches were then prepared on a white ground having such intensity that each gray patch was seen throughout as large a field as one of the color-squares. He also had three black dots of different sizes on a white ground, each of which had a normal field also corresponding to one of the color-squares. In the normal eye the black dot, gray patch, and corresponding color were seen over equal fields; and the same relation was found to hold good in most cases of amblyopia.

In three cases of hemianopsia for colors it was found that where the colors were not seen, neither the corresponding dots nor the gray patches could be recognized. He therefore concludes that the slight interference with conduction of any of the fibres of the visual tract leads to inability to recognize green, or even red, or to distinguish slight differences in luminous intensity; that a greater interference with conduction prevents the distinguishing of white from black; that the recognition of color varies with the light-sense; and, therefore, the assumption of the involvement of a particular cortical centre in cases of hemichromatopsia is unnecessary and erroneous.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OFJ. SOLIS-COHEN, M.D.,
OF PHILADELPHIA.

STRICTURE OF THE LARYNX.

At a recent meeting of the Hungarian Society of Otologists and Laryngologists (*Revue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, 1896, No. 4) DR. V. NAVRATIL described three cases of stenosis of the larynx. The first case had followed tracheotomy for dyspnoea attending acute laryngitis. The second had followed an attempt at suicide, and was due to bilateral cicatricial ankylosis of the cricoid arytenoid joints. The third case is the interesting one of the series, and seems to have been an instance of scleroma. A journalist, forty-eight years of age, had for a long time suffered with dryness of the throat, and continual cough with inability to expectorate. Serious dyspnoea had rendered tracheotomy necessary. As the respiration by the mouth could not be re-established, the case was referred to Navratil, who detected a subglottic bilateral hypertrophy of the vocal bands. All other treatments having failed, laryngotomy was performed for the purpose of excising the tumor, but the growth resisted both the knife and the scissors; hence it had to be burned away with electric cautery, and in consequence it had been impossible to preserve any portion for microscopic examination. The hypertrophic neoplasm was so incorporated with the vocal band on the right side that it was necessary to destroy in part that structure also. Consequently a portion of the right vocal band penetrated into the glottis in the form of a flap. The glottis regained its normal proportions and the patient respires comfortably on closing the orifice of the canula. The canula will be removed after the ablation of the flap, when the patient will leave the hospital completely cured.

This case gave rise to considerable discussion, in the course of which DR. MORELLI stated that he had observed analogous cases in which the secretions produced by chronic catarrh had become accumulated and fixed into the trachea. In one case, indeed, it had been necessary to practise tracheotomy, and after the removal of the canula a second tracheotomy had become necessary. This patient had a stenosis of the nose so great that a No. 3 bougie could hardly pass; the vocal bands were thick, and a great quantity of thick mucus accumulated in the trachea. Despite successful dilatation the exudation accumulated to such an extent that the removal of the canula was impossible. The patient finally became tuberculous and died.

The same gentleman had as a patient a young woman, whose nose, pharynx, and larynx, as far as the trachea, had become covered with a thick colloid mucus as hard as a stone. The patient being almost near her end, tracheotomy could not be performed in consequence of the local conditions. These

cases, he contends, demonstrate that dry rhinitis and pharyngitis are not so infrequent maladies as is often believed.

DR. NEWMANN cited two cases of subglottic hypertrophy in which there were thick folds beneath the vocal bands, the pathological nature of which could not be determined, as the patients had quit the hospital after being relieved by tracheotomy.

He had also observed in a child of twelve years a subglottic stenosis, conical in form, and produced in sequence to conjunctive hyperplasia of such a character that tracheotomy had to be performed. He had also observed, five years ago, a case similar to that of Navratil's, in which the stenosis extended as far as the bifurcation—this in sequence to primary scleroma of the nose and larynx.

OPERATIVE TREATMENT OF MULTIPLE PAPILLOMAS OF THE LARYNX.

Papers on this subject were read by DR. NAVRATIL and DR. NEUMANN at the late meeting of the Hungarian Society of Otologists and Laryngologists (*Revue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, 1896, No. 4).

NAVRATIL contends that while endolaryngeal extirpation usually succeeds in simple papilloma, whether in the adult or in the infant, the result is different in multiple papillomas when they obstruct the calibre of the larynx and give rise to dyspnœa. Here it is necessary to practise prophylactic tracheotomy first, and then to undertake the extirpation of the papilloma; in which he proceeds differently in the infant from what he does in the adult. In the infant he used to perform laryngotomy and endeavor to remove the papillomas along with the subjacent mucous membrane. Many cases had been operated upon in this way, but recurrences had taken place, though less rapidly than after the endolaryngeal method. He attributes these recurrences to the limited field, which does not permit precision in operation. Of late he has performed his tracheotomy and then extirpated the papillomas in several sittings, partly through the mouth and partly through the wound; and for two or three years he has had no recurrences in these cases.

In the adult, where the conditions and space are more favorable, he performs laryngotomy immediately after tracheotomy, and extirpates the papillomas with their base. In this way he has avoided recurrences. He concludes by stating that while he has observed no untoward results after repeated endolaryngeal operations in infants, he has three or four times seen the consecutive formation of epithelioma in adults.

Dr. Neumann, after calling attention to the great tendency to recurrence of papilloma in infants (so great that a half-pint bottle might have been filled with the growths removed from one infant in four years), states that cure seems to depend less upon radical operation than upon extinguishment of the power of reproduction, which, unfortunately, does not cease for years. He mentions an interesting case in which the papillomas disappeared of themselves, probably by spontaneous absorption, and he believes this observation to be a unique one. But, although the occurrence is rare, it has been reported before. An infant, six years of age, about whom he was consulted in the winter of 1892, had been hoarse for two years and completely aphonic for several months. Both vocal bands were covered with papillomas. These

were removed in the course of three weeks at different sittings; but although the larynx was cleared out, the irritated borders of the vocal bands would not permit loud phonation. Two or three weeks afterward the patient recommenced to respire with difficulty, the separation of the vocal bands having become insufficient. The vocal bands became inflamed, and there were two or three recurrences of these conditions. The stenosis augmenting, the patient was sent to the hospital for purposes of intubation. Intubation suppressed the dyspnoea, and the respiration remained free for a couple of hours after the removal of the tube. The recurrences increased, and it was feared that portions had been forced by intubation into the trachea, as the papillomas covered not only the vocal bands, but the free border of the epiglottis also. Toward the end of February, 1893, DR. KOVACS performed tracheotomy, which relieved the dyspnoea. The papillomas now appeared to diminish in volume. When Dr. Neumann examined the patient in the autumn he was astounded that the vegetations on the epiglottis had become completely reabsorbed, while only one papilloma was to be seen in the anterior wall of the larynx. This also gradually disappeared of itself, and certainly was not expelled by cough.

NASAL TUBERCULOMA.

DR. POLYAK reports (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, 1896, No. 4) a case in a man, forty-nine years of age, who had complained of hemorrhage and obstruction in the right nostril of six months' duration, and subsequent hemorrhage and formation in the left nostril. The right nostril was completely filled by an irregular tumor resembling granulations, which bled easily. On the left side of the anterior portion of the septum was a tissue partly covered with dried crusts of a dull white, of the dimensions of a thaler-piece, flattened, granulous here and there, but not prominent, and bleeding easily. The tumor on the right side was at once removed with the incandescent snare, when it was found that the base of the neoplasm had occupied the right side of the septum at a point corresponding with the lesions described upon the left side. Slight hemorrhage, consecutive to the operation, was arrested immediately by an insufflation of dermatol. The tumor removed was thirty millimetres in length and forty millimetres in breadth, and had erosions upon the external surface where it was covered with granulations. It contained many tubercles and very few bacilli. There was no tuberculosis of the lungs or other portion of the body.

Subsequent history of the case is unknown.

SUPPURATION OF THE MAXILLARY SINUSES CONSECUTIVE TO DEFLECTION OF THE NASAL SEPTUM.

In the *Revue Internationale de Rhinologie, Otologie, et Laryngologie*, 1896, No. 3, DR. AUGIERAS, of Laval, details a case of suppuration of the right antrum of Highmore in a man forty years of age, the septum of the nose being strongly deflected to the left side. This inflammation of the maxillary sinus, after existing for many years, had given rise to alveolo-dental periostitis.

OBSTETRICS.

UNDER THE CHARGE OF

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THE REMOVAL OF OLD ECTOPIC GESTATIONS.

VON HERFF (*Zeitschrift für Geburtshülfe*, Band xxxiv. Heft 1) concludes from his study of these cases that in removing ectopic gestation-sacs which are complicated by adhesions it is important whenever possible to ligate the uterine and spermatic arteries. An attempt should then be made to shell out the sac, beginning at the periphery of the placenta, using clamps and ligatures to control bleeding. The aperture left should be tamponed with gauze. In rare cases the site of placental attachment must be compressed by a running stitch; compression of the aorta must be employed or removal of the uterus, with application of clamps to the bleeding vessels. Gauze packing is especially valuable where oozing exists or secondary bleeding is found.

A STUDY OF FŒTAL EXCRETION.

In the *Zeitschrift für Geburtshülfe*, Band xxxiv. Heft 1, RENSING reports experiments on forty-two pregnant and parturient patients to determine the excretion by the fœtus of material introduced into the mother's body. He gave methyl-blue in capsules to the mothers, in amounts of fifteen grains daily. The drug was given until two months before labor. From half to one hour after giving this to the mother traces could be detected in the urine. When a mother was given methyl-blue half an hour before labor the urine of the fœtus showed its presence. This substance does not enter the mother's milk, as do potassium iodide and salicylates. About eight days seemed to be required to remove the methyl-blue wholly from the fœtal body, although it disappeared much more rapidly from the mother. It was found that the excretion of methyl-blue increased steadily for the first three days after birth. This corresponds with what has been observed regarding the discharge of uric acid in the newborn.

PREGNANCY AND LABOR COMPLICATED BY CANCER OF THE CERVIX.

In the *Zeitschrift für Geburtshülfe*, Band xxxiv. Heft 1, BECKMANN reports two cases of pregnancy and labor complicated by cancer of the cervix.

The first was a multipara, aged forty-seven years, who was seen in the first months of her seventh pregnancy. A sero-sanguinolent discharge was present. Malignant disease had destroyed the posterior lip of the cervix and invaded the vagina on the right. The uterus was removed by the vagina, the patient making a good recovery. Six weeks after the operation she was in a good condition.

In connection with this case Beckmann calls attention to the fact that cancer does not predispose to sterility nor does it tend to interrupt pregnancy; on the contrary, gestation is often prolonged. Abundant evidence shows the utter worthlessness of delay and palliative treatment; vaginal extirpation of the affected uterus is the treatment indicated.

His second case was admitted to the hospital in the ninth month of her sixth pregnancy; the cervix was infiltrated with carcinoma on the left side. Spontaneous labor occurred, with a living child. The puerperal period was normal. Fifteen days after labor the uterus was removed through the vagina, the carcinomatous tissue having been first thoroughly seared. The patient made a good recovery.

In studying the literature of the subject Beckmann concludes that in cases in which the entire uterus cannot be safely removed that delivery by abdominal section offers a far better chance for the mother and child than does spontaneous birth.

TREATMENT OF FACE-PRESENTATION BY MANIPULATION.

In the *Archiv für Gynäkologie*, Band li. Heft 2, JUNGSMANN reports three cases of face-presentation in which he succeeded in changing the presentation to an occipital one by a combined manipulation ascribed in various portions to Baudelocque, Schatz, and Thorn.

The patient is anæsthetized by chloroform and the shoulder of the child raised and its back moved obliquely in the direction best fitted to promote descent of the occiput by the external hand. The internal hand meanwhile raises the chin and brings down the occiput, maintaining it in the desired position until the patient wakes from the anæsthetic and pains begin. When the occiput has engaged and flexion is secured the case is allowed to proceed spontaneously.

Jungsmann concludes that in cases seen before active labor has begun that Schatz's manipulation of raising the fetal body by external manipulation and procuring flexion instead of extension should be employed. When dilatation has begun and the chin is posterior, combined manipulation should be employed when two or three fingers can be inserted through the os and cervix; when the pelvis is normal or very little contracted; and when the fetus is movable. Anæsthesia is usually required for this manipulation. Any condition of danger demanding prompt and rapid delivery is a contraindication for the use of this method.

ALBUMINURIA AND ECLAMPSIA.

SAFT (*Archiv für Gynäkologie*, Band li. Heft 2) reviews current knowledge on this subject and adds his own studies. He declares, with those who have most thoroughly studied the subject, that while the relation between albuminuria and eclampsia is intimate, that it is not invariably causal; the direction of our study should lie in searching to identify the causal agent present.

Saft found albuminuria in 54.1 per cent. of pregnant women, usually in the second half of pregnancy, most often near the close. The greatest amount of albumin is often found several weeks before the end of pregnancy, occurring more often in primigravidæ than in multigravidæ, and so continuing

during labor, when the quantity of albumin is much greater. While albumin usually disappears from the urine during the first few days after labor, it persists longer in primigravidæ than in multigravidæ; kidney-lesions are more serious and persistent in primigravidæ than multigravidæ.

Blood-corpuscles without albumin in the urine of pregnant women come from the bladder, casts accompanying albumin. Casts and albumin do not stand in close relation to each other, nor do the amounts of albumin and casts maintain a corresponding ratio. Twin pregnancy, hydramnios, and contracted pelvis favor albuminuria in pregnancy, especially in primigravidæ. In multigravidæ these complications cause albuminuria during labor. Abortion often occurs in albuminuric patients.

Saft believes the pathology of eclampsia to be as follows: The organism becomes partially intoxicated by products of metabolism. During labor great muscular activity increases this condition. The elimination of these toxins produces a partial degeneration of the kidneys, from which healthy women speedily recover. Corresponding changes occur in other organs of elimination. When heart-lesions are present or acute nephritis occurs the prognosis is most grave. Patients in good condition previous to pregnancy usually recover completely.

TEN OPERATIONS FOR ECTOPIC GESTATION.

HARRISON CRIPPS (*British Medical Journal*, 1896, No. 1839) reports ten cases of ectopic gestation, in all but one of which a successful result followed operation. In one case, upon opening the abdomen and removing a large quantity of blood, it was found that the Fallopian tube had ruptured, and that a blood-clot was protruding through an aperture of considerable size. The ovary and tube were removed, the abdominal cavity flushed, but not drained.

The second case was that of a woman who had borne two children, and who had almost constant pain, with vaginal hemorrhage, for some time. The contents of the abdomen and pelvis were found matted together. A cavity was found containing a blood-clot as large as the fetal head, while a second cavity contained a smaller quantity of blood. The ovaries and tubes were removed, and the abdomen flushed and drained for a few days with a successful result.

In another case, in which pain and hemorrhage had gone on for some time with previous sterility, a cyst was found upon the opening of the abdomen. The cyst was removed, and the cavity flushed and drained.

In another interesting case a ruptured cyst was discovered in Douglas's cul-de-sac, and the effort was made to separate it and draw it up; this caused hemorrhage, however, so severe that the sac was ligated and removed. Several other cases of the series presented very similar conditions.

His tenth case was in a multigravida, in whom a tumor was found behind the uterus, apparently between the folds of the broad ligament; this presented the appearance of the gravid uterus, and was found to contain a living fœtus. The placenta was firmly adherent to the wall of the sac. An effort was made to stitch the sac to the abdominal incision, but it was situated so deeply that the result was not satisfactory. The abdomen was closed without drainage. Death ensued three days later. On post-mortem examination it was found that the placenta, which had been left, was soft and friable, and beginning to decompose.

GYNECOLOGY.

UNDER THE CHARGE OF

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SHORTENING OF THE SACRO-UTERINE LIGAMENTS FOR RETROVERSION.

GOTTSCHALK (*Centralblatt für Gynäkologie*, 1896, No. 16) believes that since relaxation of the sacro-uterine ligaments and loss of normal fixation of the cervix are the principal causes of movable retroflexion (as pointed out by Schultz), especially after labor, shortening of the ligaments is the most rational way of effecting a cure. His technique is as follows: The uterus is first replaced, if movable. A median vertical section is then made through the posterior vaginal fornix, which begins half an inch behind the portio and extends downward to the extent of two inches. Douglas's pouch is opened; the edges of the vaginal and peritoneal incisions are united with temporary sutures, which always serve to keep the wound open. If the uterus is fixed, the adhesions are separated and the uterus is replaced. The operator then fixes the left sacro-uterine ligament with the tip of the left forefinger at a point as far as possible from its cervical insertion (one to two inches), while an assistant strongly everts the edges of the wound by making traction outward on the temporary ligatures. Guarded by the finger, and under direct control of the eye, an aneurism-needle carrying a stout silk suture is passed from above downward through the middle of the ligament, and the suture is tied. The other end of the suture is threaded on a sharp needle, which is entered in the posterior wall of the cervix just below the level of the os internum, and being carried deeply emerges in the portio at a point near the edge of the vaginal wound. Both ends are tied so that the knot lies in the vaginal fornix. The same procedure is adopted on the opposite side, a small strip of gauze is introduced into Douglas's pouch, and the wound is allowed to close by granulation. If the uterus has in the meantime fallen backward, it is again replaced, and is kept in position by a firm vaginal tampon. The patient is kept on the side or stomach, but is allowed to leave her bed on the seventh day, when the tampons are removed and replaced by another in the anterior fornix, which is left *in situ* for three days. The sutures are not removed. The writer has performed two operations by this method, with perfect results, the uterus remaining in a normal position, but with free mobility. There were no unpleasant symptoms. Both patients had been treated with pessaries for several years.

HYSTERECTOMY WITH THE CAUTERY.

KÜMMELL (*Centralblatt für Gynäkologie*, 1896, No. 16) refers to the fact that the statistics of total extirpation for cancer during the last sixteen years show that only 7 per cent. of the patients operated upon are radically cured. He believes that if the glands are already involved the radical operation is

useless, and that it is impossible to avoid metastases. Recurrences are due to the fact that either all the diseased tissue has not been removed, or the surrounded surface was infected during the operation.

That such infection does occur has been amply proved in numerous reported cases as well as by experiments. Different plans have been suggested for avoiding this. Winter advises against preliminary curettage of the cancerous tissue, and sutures the cervix in cases of carcinoma of the corporeal endometrium. Hahn suggests constant irrigation with sublimate solutions throughout the operation. The writer believes that infection can be prevented by the use of the galvano-caustic knife, which he uses to separate the broad ligaments and open the anterior and posterior culs-de-sac. He also uses clamps.

ANTERIOR COLPORRHAPHY IN PROLAPSUS UTERI.

NIEBERGALL (*Inaugural Dissertation*, abstract in *Centralblatt für Gynäkologie*, 1896, No. 16) reports the results of operations for prolapsus at the Basle clinic during seven years. Fifty cases were treated by simple anterior colporrhaphy and sixty by double anterior colporrhaphy, the cervix being previously amputated in nearly every instance. Seventy patients were kept under subsequent observation. Twenty-nine out of thirty-four in the latter class were cured; in the former twenty-eight out of thirty-six were cured, the total percentage of cures being 81.5 per cent. Posterior colporrhaphy was always performed two weeks after the first operation, silver-wire sutures being used. Considerable stress is laid upon the importance of allowing an interval of time to elapse between the two operations.

VAGINAL FIXATION.

JOHANNOVSKY (*Wiener klin. Wochenschrift*, 1896, Nos. 6-10) has performed thirty operations, no patient having become pregnant. One case resulted fatally from sepsis, but in all the others the uterus was subsequently found to be in normal position, though the symptoms were not always relieved. The operation is not applicable to cases in which the retroflexed uterus is firmly fixed by adhesions to the posterior and lateral walls of the pelvis. In operations on the adnexa he recommends dividing perimetric adhesions with the Paquelin cautery, as suggested by Dührssen and Küstner. Omental and intestinal adhesions do not constitute a contraindication.

The disadvantages of the vaginal operation are the frequent technical difficulty and the great care necessary to secure absolute asepsis; so that it cannot be regarded as a substitute for abdominal section.

On account of the serious results which have followed pregnancy and labor after vagino-fixation of the uterus, the writer advises against its performance in the case of young women.

DIAGNOSTIC CURETTAGE.

GESSNER (*Ibid.*) believes that the value of curettage for diagnostic purposes is not yet sufficiently appreciated in spite of the advance in microscopical technique. Even in Germany palpation of the uterine cavity is

still regarded as the best method of examining the uterine cavity in cases of suspected malignant disease. Preliminary dilatation of the cervix sufficient to admit the examining finger, whether rapid or gradual, is not free from danger; in fact, fatal cases have been reported. On the other hand, curettage is safer, even with the possible attendant risks of perforation and infection. Narcosis is unnecessary, and the diagnosis is made at a single sitting.

Under some circumstances (in the case of a narrow, senile vagina, a long, rigid cervix, or a uterus enlarged by fibroid) intrauterine palpation may be impossible. The finger cannot always distinguish malignant from non-malignant growths. Here the removal of fragments with the curette furnishes positive information.

During the past five years the diagnosis of malignant disease of the corporeal endometrium has been made at the Berlin clinic in forty-one cases, and the uterus extirpated, direct palpation having been entirely discarded.

Diagnostic curettage is best performed under ether, the cervix being previously dilated. The entire surface of the uterine cavity should be scraped, the fragments removed being hardened in alcohol and examined microscopically.

TREATMENT OF PRURITUS VULVÆ.

In a recent discussion on this subject before the Berlin Obstetrical Society (*Centralblatt für Gynäkologie*, 1896, No. 18) RÜGE stated that pruritus was nearly always due to some local cause, and that he seldom failed to cure it by thorough cleaning of the external and internal genitals.

Martin agreed with this statement, but also recommended shaving the external genitals and applying flower of sulphur. Flaischler uses solutions of sulphur varying in strength from 20 to 50 per cent. Glockner employs 1 per cent. solution of sulphate of zinc and 10 per cent. aristol ointment. Gottschalk recommends 10 per cent. thymol ointment, with or without cocaine. Olshausen thought that diabetes was the cause of obstinate pruritus in the majority of the cases, though in some it was a neurosis which resisted all treatment. Bodenstein uses a strong solution of nitrate of silver (40 per cent.), though he had cured the affection with a 1 per cent. solution.

CANCER AND TUBERCULOSIS OF THE UTERUS.

NASSANER (*Centralblatt für Gynäkologie*, 1896, No. 18) reports a rare case of epithelioma of the cervix uteri, in which an examination of the extirpated organ showed several tuberculous nodules, the size of cherries, situated in the corporeal endometrium, the lowest being an inch above the upper limit of the malignant disease. These nodules were supposed to be cancerous until they were examined microscopically, when they were found to contain numerous giant cells and tubercle bacilli. The apparently healthy endometrium was also the seat of beginning tuberculous disease.

Since the cancerous affection was upward of four months' standing and the tubercles were evidently of recent origin, the writer inferred that the latter developed subsequently and were the primary seat of infection. There was no evidence of tuberculosis elsewhere in the body.

PÆDIATRICS.

UNDER THE CHARGE OF

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OF PHILADELPHIA ;

ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,

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THE INCREASE IN WEIGHT OF PREMATURE INFANTS.

POTEL devotes his thesis (Paris, 1895) to this interesting subject, founding it upon a study of 173 infants born at periods from six and one-half to eight months of intrauterine life, who survived the dangerous period and were discharged from the maternity after a sojourn of an average of eighty-two days for the six and one-half months children and of twenty-eight days for those of eight months. Of 56 infants born at six and one-half months, 11 survived—a survival of 19.6 per cent., or a mortality of 80.4 per cent. The average increase in weight per day for one of these children was 9.4 gm. Of 131 infants born at seven months the survival was 41.9 per cent.; the mean daily increase of weight was 11.5 gm. Of 53 infants born at seven and one-half months the survival was 69 per cent. and the increase of weight 13.8 gm. Of 110 infants born at eight months 64.5 per cent. survived and the daily increase averaged 22.8 gm. The average weights at birth were as follows: At six and one-half months, 1408 gm.; at seven months, 1700 gm.; at seven and one-half months, 1900 gm.; and at eight months, 2150 gm. The loss of weight of the first three days in the premature is not more marked than in infants at term, but its consequences are more grave, since the recovery of the initial weight takes longer; it is also during this period of loss or stationary weight that the mortality is highest, those infants exempt from hereditary taint being the most resistant.

The increase in weight, as shown by the figures quoted, is longer deferred and slower as the infant is more premature. Thus, with an infant of six and one-half months the increase often does not commence till after the second week.

The proportion of infants saved is a tribute to the modern methods of dealing with these unfortunate cases.

A CASE OF TUBERCULOSIS OF THE INTESTINE BY INGESTION.

MARFAN and APERT (*Revue Mensuelle des Maladies de l'Enfance*, June, 1896, p. 273) record an interesting example of a form of tuberculous disease which is rare under the age of two years. The child, aged sixteen months, had been nourished only at the breast, with the exception of certain days, when the mother being at work, cow's milk had been given. The family history showed healed tuberculous cervical adenitis in the mother; one of her nine other children had died of tuberculous peritonitis and another had coxalgia.

At the age of nine months the patient had come under treatment for a suppurative adenitis of the neck, and at this time it was noticed that there were ulcerations upon the gums, covered by pultaceous and fetid exudate, which persisted despite treatment instituted at the time. At the age of thirteen months a diarrhœa began and persisted without amelioration till death, a few days after admission to the hospital. The autopsy revealed an enormous mass of tuberculous mesenteric glands, with tuberculous ulcerations of the colon, ileum, jejunum, and duodenum; liver, spleen, heart, and kidneys normal; a few small, recent grayish granulations in the lungs, with two small foci of broncho-pneumonia in the right base.

According to the authors, the first focus of disease was the mouth and the ganglia of the neck; next the intestine. The slight pulmonary lesions were of recent origin. The source of the infection may have been the milk of the mother or of the cow, or through the medium of soiled objects put in the mouth. Inoculation-experiments to clear up this point were not possible at the time.

Tuberculosis of the intestine is exceptional in the first two years of life, as shown by the statistics of Wiederhofer, who, in 101 cases of intestinal tuberculosis in childhood, found only six under two years of age and a percentage of eight for all cases of tuberculosis under two years, as opposed to 28 per cent. for cases in children from two to fifteen years of age. Three sources of origin for intestinal tuberculosis are possible: 1. In acute miliary tuberculosis small, gray, semi-transparent granulations may be found upon the intestinal mucous membrane. These are hæmatogenous in origin. 2. In young children with chronic pulmonary tuberculosis with cavities the intestine may be infected from the swallowed expectoration; the lesion then assumes the common ulcerous form seen in adult consumptives; it is extremely rare under two years. 3. After the ingestion of tuberculous food, especially the milk of a tuberculous cow. In these cases there may be no lesion of the intestinal mucous membrane, the bacillus having traversed it to find a suitable soil for growth in the mesenteric glands. When lesion of the mucous membrane occurs it ordinarily assumes a special form—discrete without ulceration. This is characterized by scattered submucous nodules, the size of a pea, filled with gray or cheesy, more or less softened material, and limited by a delicate fibrous covering, these nodules corresponding in position with the affected mesenteric gland.

PRIMARY SARCOMA OF THE VAGINA IN CHILDREN.

D'ARCY POWER (*St. Bartholomew's Hospital Reports*, 1896, vol. xxxi.) records a case under this title occurring in a girl of two years and four months, and quotes abstracts of twenty-four other cases collected in a rather hasty examination of the literature. From a consideration of these cases he concludes that primary sarcoma of the vagina is only a specialized form of malignant disease which may affect any or all of those connective tissues which are involved in the complicated developmental processes associated with the formation of the cloaca. The sarcoma grows in the connective tissue of the pelvic organs, and extends into the bladder, the urethra, the uterus, or the vagina. It is either well circumscribed, as in the case described, or is diffuse,

as in a case reported by AHLFELD (*Archiv f. Gynäkol.*, Bd. xvi. p. 135), but whether circumscribed or diffuse, whether affecting the vagina alone or infiltrating all the neighboring organs, this form of sarcoma shows an almost constant tendency to become polypoid and multiple.

As it occurs in children, primary sarcoma does not, in the majority of cases, run a very rapid course. It does not ulcerate very readily. It does not usually affect the lymphatic glands. It does not disseminate, but its prognosis is very grave. It recurs quickly after removal, and it kills by interfering with the action of the pelvic organs, by retention of urine more often than by obstruction of the bowels. The diagnosis is easy, but the polypi are often looked upon as innocent growths, and their true nature remains unrecognized until the presence of a tumor in the pelvis shows that it is too late for surgical interference. Multiple polypi of the rectum and of the genito-urinary tract in young people, however, are so rare, and, when they do occur, are so often associated with malignant disease, that their presence should always lead to a suspicion of such a condition. The complete cure which has been effected in one or two cases of primary sarcoma of the vagina in children shows that the early and complete removal of the growth may be effectual in this as in other forms of malignant disease.

BACTERIOLOGY OF THE VAGINA OF THE NEWBORN.

VAHLE (*Zeitschrift f. Geburtsh. u. Gynäkol.*, vol. xxxii. No. 3) has examined cultures from the vaginas of 75 newborn girl-babies shortly after birth. In the first twelve hours the vaginal secretions were always sterile. From this time to the third day the results showed a decreasing number in which sterile secretions could be found, until finally at the end of three days micro-organisms were found in all cases. Pathogenic bacteria were quite often encountered, the streptococcus being found in 14.6 per cent. of the cases.

BACTERIOLOGY OF THE ANGINAS OF SCARLATINA.

LEMOINE (*Société Médicale des Hôpitaux*, December 20, 1895) has analyzed 100 cases of scarlatinal angina observed at the beginning of the infection. Cultures were made from the deep tissue of the tonsils after searing the surface by the actual cautery. In all the cases he found the streptococcus, ninety-three times in pure culture, seven times associated, fifteen times with the bacillus of Loeffler, twice with the colon-bacillus. Clinically it is interesting to note that these two associations produce the same symptomatology. The author thinks that there is here only one variety of streptococcus, but that the virulence of this microbe varies with its soil, whether found in the mucus, false membrane, or tissue of the tonsil.

A VARIETY OF STREPTOCOCCUS REFRACTORY TO MARMOREK'S SERUM.

MÉRY (*Soc. de Biologie*, April 18, 1896) states that he has isolated from a case of scarlatina a streptococcus without any morphological or cultural peculiarity to distinguish it from other streptococci, but showing the remarkable property of causing purulent arthritis and death in injected rabbits despite the previous or contemporaneous inoculation with Marmorek's serum.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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IDENTIFICATION OF THE SPIRILLUM OF ASIATIC CHOLERA.

In the course of an exhaustive study of the cholera vibrio, more particularly as regards the artificial induction of immunity to its inoculation in animals, R. Pfeiffer discovered the interesting fact that when mixed with the serum of immunized guinea-pigs, and inoculated into the peritoneal cavity of susceptible animals, virulent cultures of the spirilla in large dose remained innocuous, and that on subsequent examination of the peritoneal contents the bacteria could be seen to have undergone disintegration to a greater or less extent, dependent upon the relative immunizing strength of the serum of the immunized animal. This power of destroying the cholera spirilla is believed by Pfeiffer to depend upon the presence in the serum of certain antagonistic substances ("Antikörper") which have a distinct inhibiting influence upon the vital processes of the bacteria. As a result of this discovery PFEIFFER (*Zeitschrift f. Hygiene und Infektionskrankheiten*, 1895, xix. p. 75) has suggested a test of the identity of the cholera spirillum, for his investigations show that no other species of bacteria is affected in the same way by mixing with the serum. It will be remembered that a similar test was alluded to in connection with the identification of the typhoid bacillus (*Cf. AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, May, 1896, p. 624).

The method suggested by Pfeiffer is as follows: A loopful of the culture to be tested is mixed with a cubic centimetre of bouillon, to which ten times the amount of serum necessary to protect a guinea-pig of 200 grammes weight from a similar dose of virulent cholera spirilla has been added, and the whole is at once inoculated into the peritoneal cavity of a young guinea-pig of from 200 to 300 grammes weight. In the inoculation care should be taken to avoid injury of the intestines, and the cultures employed should be recent and should have been shown to consist of well-formed and actively moving germs.

As control, a similar quantity of the same culture is mixed with a cubic centimetre of bouillon as before, an amount of ordinary guinea-pig serum equal to the amount of immunizing serum made use of in the original test is added, and the whole is inoculated into another guinea-pig.

In twenty minutes some of the peritoneal contents in each case is withdrawn by means of glass pipettes, and is examined. If the bacteria are the specific germs of cholera they present a very different appearance in the two cases. Those obtained from the control-animal are well formed, active, and seem to have multiplied. Those which were exposed to the action of the immunizing serum are small, misshapen, immobile for the most part, apparently dead. Pfeiffer maintains that unless a distinct difference is

observable between the bacteria in the two experiments the micro-organism under examination must be regarded as probably *not* the cholera vibrio, since the change described is very constant in the case of the cholera germ, and has not been observed to occur with any other under similar conditions. Pfeiffer accordingly presents this as a specific differential test for the cholera bacillus.

Since the publication of the above test a simpler modification of it, not requiring the inoculation of animals, has been suggested by PFEIFFER and VAGEDES (*Centralblatt f. Bakteriologie*, etc., 1896, xix. No. 11, 385), and has been found to be of great use in distinguishing the pathogenic species from other closely allied forms.

In the course of experiments directed to the explanation of the disintegration of the bacteria which occurs when they are mixed with immunizing serum and inoculated, it was discovered by Pfeiffer that the bacilli did not undergo disintegration when they were exposed to the action of the serum in a test-tube only. In this case the activity of the germs was inhibited, and they collected at the bottom of the test-tube in flocculi, but their shape remained unaltered. It was further noted that after a variable time in the incubator the flocculi began to break up, microscopic examination showing that the germs were recovering their mobility and were gradually returning to their normal condition. From this Pfeiffer inferred that the effect of the immunizing serum is to inhibit temporarily the activity of the germs, but that without the body-juices it is incapable of destroying them.

The test evolved from these observations depends upon the fact that no other germ than the cholera-bacillus is similarly inhibited in its activity by the specific immunizing serum. As suggested by Pfeiffer and Vagedes, it is carried out in the "hanging drop." The serum employed by them had an immunizing power such that one-fifteenth milligramme was capable of protecting a 200-gramme guinea-pig against a dose of 2 milligrammes of virulent cholera-culture. This serum was diluted with fifty times its quantity of bouillon, and hanging drops of it were inoculated with the culture to be tested. The microscope showed the gradual inhibition of the activity of the cholera-bacilli, resulting in the complete inactivity of all present after twenty minutes. The cultures were then placed in the incubator and examined from time to time. In the course of twenty-four hours the activity had returned, and the germs had undergone considerable multiplication.

The constancy of this test may be inferred from the fact that Pfeiffer and Vagedes tested seventy different cultures of the cholera-bacillus and twenty of various other closely allied species, and found it reliable in all. The cholera-germs were always inhibited in their activity; the other species, never.

Pfeiffer announces that he is prepared to furnish serum of a sufficient immunizing strength for this test to any who desire to confirm the reliability of the test or to determine the nature of any suspected cultures.

THE CAUSE OF DEATH IN ACUTE LOBAR PNEUMONIA.

Some recent observations of BOLLINGER (*Münchener med. Wochenschrift*, 1895, No. 32) made at autopsies in cases of pneumonia are of interest as

suggesting a new factor in bringing about a lethal outcome of the disease. In addition to the causes of death usually recognized as operative in lobar pneumonia—intensity of infection, insufficiency of the lungs, complications, such as meningitis, etc., and heart-failure—Bollinger draws attention to oligæmia as a common and often very pronounced feature of the disease, and argues that the collapse often observed in it is due, in great part at least, to the diminished quantity of blood and consequent poor nutrition of the vital organs.

This belief is based upon the anæmic condition of all the organs, as observed at autopsy, more particularly of the skin, brain, liver, kidneys, and spleen, and the paucity of blood is attributed to the great drain upon it incident to the accumulation of the pulmonary exudate. This Bollinger finds to be often enormous. The weight of 100 pneumonic lungs showed that in fifty the exudate had accumulated in an amount greater than two pounds in weight; in forty there was between one and two pounds of exudate, and in only ten was there less than a pound. The diminution in the quantity of blood in the body seemed to bear a direct relation to the quantity of exudate.

Of course, without a defective generation of blood, the withdrawal of it in the exudate would quickly be compensated by the formation of a new supply by the blood-forming organs, and Bollinger is accordingly forced to suppose a diminished vitality of these organs in the cases in which oligæmia is marked. In this connection attention is drawn to the fact that leucocytosis in pneumonia has been shown to be a distinctly favorable prognostic indication, and Bollinger would interpret this leucocytosis as an evidence of blood-formation.

The critical collapse and heart failure so often met with in pneumonia are explained as the direct results of the oligæmia, in consequence of which the already greatly weakened heart-muscle gives out because of an insufficient blood- and oxygen-supply.

ALIMENTARY TUBERCULOSIS.

ZINN (*Münchener medicinische Wochenschrift*, 1895, No. 37, 856) gives a detailed account of an interesting case of acute general miliary tuberculosis in a man thirty-eight years of age, in which the evidence points very strongly to an alimentary source of infection.

The lungs showed no old lesions of the disease in any part. At the ileo-cælic junction there was a large cluster of cheesy mesenteric glands containing myriads of tubercle-bacilli, while in the intestine near the ileo-cæcal valve an old healed scar was believed to mark the site of the original ulcer through which the entrance of the infectious material had occurred. Above and below this point, in the small and large intestine, there were recent tuberculous ulcerations. Tubercles were also distributed along the course of the thoracic duct, whose lumen was in places completely filled by cheesy masses.

Zinn believes that the bacilli were conveyed in the lymph from the original intestinal ulcer to the neighboring mesenteric lymph-glands, the disintegration of which led to their further transport to the thoracic duct, through which they found entrance to the general circulation and gave rise to the general infection which caused the patient's death.

The exact source of the original infection was uncertain, but milk is mentioned as a possible carrier of the bacilli.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF
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AND

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TOXICITY OF ALCOHOLIC BEVERAGES.

DR. A. JEFFROY and DR. R. SERVEAUX (*Archives de Médecine Expérimentale et d'Anatomie Pathologique*, 1895, p. 569) have devised a new method for determining the toxic equivalents of the various alcohols and other matters in alcoholic drinks. The liquids were injected into the circulation through the vein of the ear of rabbits, and in order to prevent clotting of the blood, which with other experimenters has always been a drawback, a watery extract of leeches was injected at the same time. This was obtained by macerating for four to six hours in dilute salt solution the anterior ends of leeches cut up into small bits. As a result of their experiments we have a table of equivalents which in some respects agrees with and in others disagrees with those of Dujardin-Beaumetz and Audigé. The toxic equivalents—*i. e.*, the amount in grammes necessary per kilogram to kill a rabbit—determined by their process were as follows:

	Dujardin-Beaumetz.	Jeffroy-Serveaux.
Methyl alcohol	7.00	25.25
Ethyl "	7.75	11.70
Propyl "	3.75	3.40
Butyl "	1.85	1.45
Amyl "	1.50	0.63
Aldehyd	1.00	1.14
Furfurol		0.24
Acetone	5.00	5.27

In other words, the poisonous properties increase with the boiling-point and molecular weight. The toxic equivalent of new (genuine) cognac was found to be 11.41; that of apple brandy 10.57. Absinthe appeared to be extremely toxic, about like furfurol and amyl alcohol.

DR. G. DAREMBERG, experimenting in the same line (*Archives de Médecine Expérimentale, etc.*, 1895, p. 719), found that, in general, reckoning from equal alcoholic content, the alcoholics are injurious in direct proportion as they are natural and least adulterated. If rectified spirits have been added, they become relatively less poisonous, since the particularly injurious matters, the higher alcohols, furfurol, aldehyd, etc., are especially present in natural wines and in spirits obtained by distillation of such wines. Thus cognac, the pure article, is more toxic than the artificial substitute made with pure alcohol. For instance, an old genuine cognac contains about 2 per cent. of impurities, chiefly fatty acids, as acetic, higher alcohols, as amyl alcohol,

aldehyds as furfural or pyromucic aldehyd; and all of these are much more poisonous than the ordinary ethyl alcohol. Apple brandy is more toxic than cognac, anisette and angostura bitters very toxic, and absinthe the "plus terrible des apéritifs." His conclusions are that of all alcoholic drinks the most dangerous are the liqueurs such as absinthe and anisette, the least harmful those made with pure alcohol and non-toxic flavors and without essential oils; that wines are proportionately more toxic than brandy, and white wines less than red.

DR. J. ROUBINOWITCH (*Gazette des Hôpitaux*, 1895, p. 237), speaking of the greater toxicity of alcohols with increase in the molecular weight, calls attention to the fact that the beverages distilled from cider, perry, grains, potatoes, and molasses are much more injurious than those derived from wine. In dealing with the question of restricting the use of alcohol by legislation, Dr. Roubinowitch, after considering the various methods, such as increasing the tax on alcohol, restricting the number of licenses, the Norwegian system, etc., concludes that the system of total prohibition is the best, and falls into the curious error of citing the results of the prohibitory laws of Maine as a most convincing argument, when, as is well known, Maine is practically a "free-run" State. "Ce fut pour l'état du Maine une révolution des plus heureuses, puisque en peu d'années cet état, le plus pauvre de l'Union Américaine devint l'un des plus prospères."

INFECTIOUSNESS OF DUST IN CONSUMPTIVE COMMUNITIES.

DR IRVIN H. HANCE (*Diebetic and Hygienic Gazette*, February, 1896, quoting from *Medical Record*) has conducted some instructive experiments to determine the danger of infection in a large community of consumptives, where all sanitary measures for the care and disinfection of sputa are enforced. These experiments were performed at the Adirondack Cottage Sanitarium, and a complete examination was made of the group of buildings, some of which had been occupied by consumptives for eleven years. Dust was taken from the places most likely to be infected. One square yard of dust from each of four buildings (the main building containing parlor, sitting-room, and library, the infirmary where all the acutely sick are sent, the oldest cottage and the newest) was collected and inoculated into ten guinea-pigs, and half a square yard from each of thirteen other cottages was collected and inoculated into others. The animals were kept from one to three months and then killed. In all, eighty-one were inoculated with from two to three cubic centimetres of sterilized water with the dust in suspension. Four inoculated with dust from the infirmary and main building died of other infectious diseases on the third to sixth day. Five of the ten inoculated with dust from the oldest cottage, which was always occupied by the sickest men, one of whom had been complained of by his room-mate for spitting about the cottage, were tuberculous. The dust from the other sixteen buildings occupied by consumptives was found to be absolutely free from infectious material. At this Sanitarium the methods taken to guard against infecting the cottages and public rooms are to burn all cuspidors daily and the Japanese napkins as soon after using as possible; never to expectorate except into the large sanitary cuspidors or into the small individual hand-cuspidors. Paper

napkins are used in hemorrhage cases and where patients are too feeble to get up on their elbows to spit into the cuspidors, and these are burned after being once used. The cottages are built to insure thorough ventilation, the rooms wainscoted and painted rather than papered, thus permitting thorough cleansing, and they are furnished simply and with a minimum of tapestry. Not one of the twenty to twenty-five attendants has ever developed tuberculosis.

In this connection, the following from *Food and Sanitation*, January 18, 1896, is pertinent: Forty years ago Mentone was a healthy village in France, where lived peasantry happy on their farms, and their superb physical state conditioned by the climate. It was discovered that the region was a most healing climate for consumptives, and it became the Mecca for the unfortunates of Europe so stricken. The inhabitants abandoned their farms to wait upon the strangers. The strong, healthy women forsook their dairies and became the washerwomen of the consumptives' clothes. No precautions were taken; the disease was not then understood as now, the theory of the tubercle-bacillus not having been discovered. The place to-day is bacillus-ridden, a pest-hole, death itself. The hitherto strong inhabitants are emaciated, a coughing, bleeding people, filled with the germs of consumption. The soil and the air are both contaminated with them. It is no longer a resort. The same fate, it is believed, awaits many other similar health-resorts unless active measures are taken to destroy all germs. This will be a most difficult task, because consumptives themselves, as a rule, are not thoughtful of the danger they spread or of the rights of others. They should bear in mind that if all others had been careful they, too, might have escaped.

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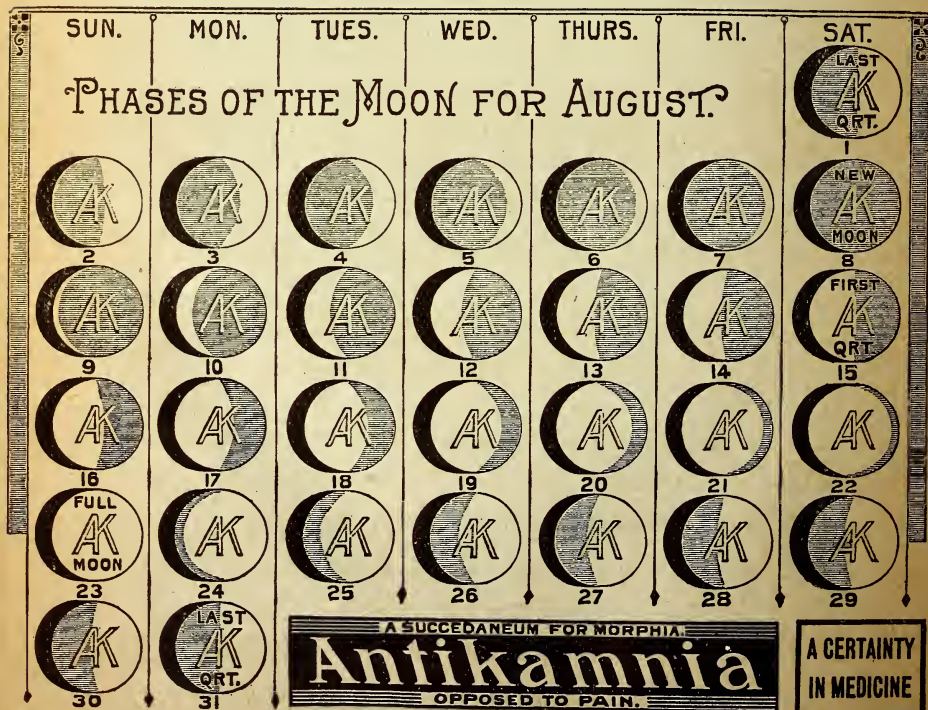
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Many persons have fair health during the cooler months of the year, yet suffer greatly from debility during the long, hot summer. The relaxing effects of the heat itself, besides the loss of the salts of the tissues, through the excessive colliquative perspiration, prove exceedingly depressing to the vital powers. Not only is this condition of extreme debility very depressing in itself, but it also predisposes the victims to attacks of disease which they would otherwise be able to resist. Thus, towards the latter part of the heated term, we have a long list of protracted, exhaustive fevers, for the fatal issue of which the extreme debility of the patients is largely responsible.

In all this we may see another demonstration of the value of the phosphorous salts of lime and soda as tonic and vitalizing agents in the animal economy, and also a definite clue to the proper remedy for the condition described, as these tissue-salts are largely wasted in excessive perspiration. This remedy is the pure Hypophosphites of Lime and Soda.

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Observations on Infant Feeding

Sir William O. Priestley, M. D., contributes to the *British Medical Journal* for December 7th an article on this subject, in which he remarks that the well-being of infants is so important, not only in a domestic sense, but in relation to the State, that it may well engage the best faculties of medical men, and not be left to the bungling mismanagement of ignorant nurses. The prevailing fallacy among these women, he says, is that an infant's food cannot be nutritious unless it is thick, and they feed infants soon after birth with various mixtures of farinaceous stuffs which the young stomach cannot assimilate.—*New York Medical Journal*.

Mothers' milk is the standard which we take, and it is thin and "watery" apparently. It is a popular fallacy that a thick food is a *rich* food; this is, no doubt, due to the long use of farinaceous foods. Milk thickened with "farinaceous food," etc., is in reality, not "richer" but is diluted, and diluted with substances indigestible for a nursing infant.—*Fairchild's Peptogenic Pamphlet*.

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